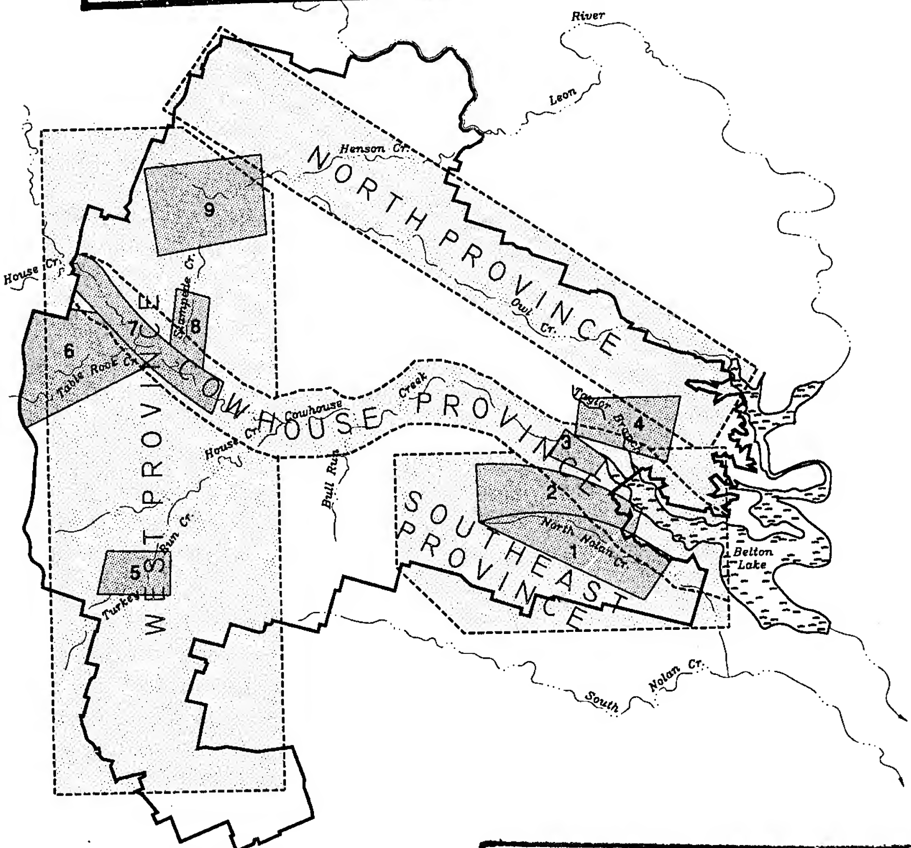
NRHP SIGNIFICANCE TESTING OF 57 PREHISTORIC ARCHEOLOGICAL SITES ON FORT HOOD, TEXAS

VOLUME II

Edited by
James T. Abbott
W. Nicholas Trierweiler



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UNITED STATES ARMY FORT HOOD
ARCHEOLOGICAL RESOURCE MANAGEMENT SERIES
RESEARCH REPORT NO. 34

1995

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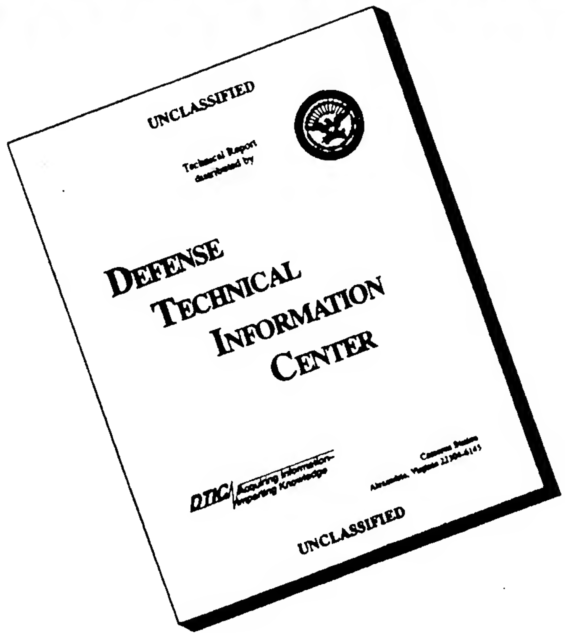

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VOLUME II

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Environmental Management Office
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6.0 RESULTS OF TESTING - CORYELL COUNTY SITES

This chapter continues documentation of the substantive testing results for the 27 sites located in Coryell County. Results for the 30 sites in Bell County have been presented in Chapter 5.0. Within both chapters, sites are presented in ascending site number order.

As in Chapter 5.0, three major discussions are presented for each site. First, an introduction briefly describes the site including its setting, location, previous work, and new work conducted. The second major discussion presents descriptions of test pits, backhoe trenches, stratigraphic zones, and cultural features as well as artifact analyses and sample assays. As warranted, results for discrete occupations are presented in separate discussions, followed by a site-level synthesis. The third major discussion for each site presents summary conclusions and develops explicit recommendations for further management of the site.

6.1 SITE 41CV95

6.1.1 Introduction

In September 1993, Mariah conducted test excavations at site 41CV95. Testing was designed to evaluate eligibility of this site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994)

6.1.1.1 Location and Description

Site 41CV95 is located in the West Cowhouse area of Fort Hood. The site is situated on a terrace of Cowhouse Creek and a winding, unnamed, intermittent tributary that defines the eastern boundary of the site (Figure 6.1). A vehicle trail traverses the northern portion of the site. Most of the site is covered with juniper and hardwood trees, but vegetation consists of dense grasses and underbrush where the site has been cleared during the historic period (Figure 6.2). The site measures 375 x 150 m, (about 56,250 m^2, or 14 acres). For purposes of this report, the site is considered part of the West Cowhouse site group.

6.1.1.2 Previous Work

The site was first recorded by Thomas in 1976 and described as a hunting or chipping station below a limestone bluff on the terrace of Cowhouse Creek. Nineteen artifacts, including debitage, a thumbnail scraper, and a core, were recovered at that time. Kooren revisited the site in 1986 and found more retouched flakes and burned rock scatter features.

Quigg and Frederick visited the site on 15 January 1992 and conducted archeological and geomorphological assessments which determined the possible presence of subsurface cultural material. The site was large, but was confined to terraces of Cowhouse Creek and the tributary and was not divided into geomorphic subareas. Two burned rock concentrations (Fs 1 and 2) were identified on the northern portion of the site. A shovel testing crew returned to the site between 3 and 5 March 1992 and excavated 21 shovel tests on the site. Of these, ten in the northern third of the site and two in burned rock features yielded cultural material. Most of the artifacts recovered from the shovel tests were burned rocks, however, a small amount of lithics was also found. The cultural material was recovered mostly from 10 to 30 cmbs, with some extending as deep as 45 cmbs. The shovel tests and the potential depth of the alluvial deposits forming the terrace suggested that intact buried components could be present at the site. However, the site's eligibility for inclusion in the NRHP was uncertain, and recommendations were made to avoid the site or to test it if avoidance was not feasible. Recommendations for formal testing in the northern portion of the site included two to three backhoe trenches and 3 to 5 m^2 of manually excavated units near the positive shovel tests. Two to three backhoe trenches were recommended for the southern portion of the site,

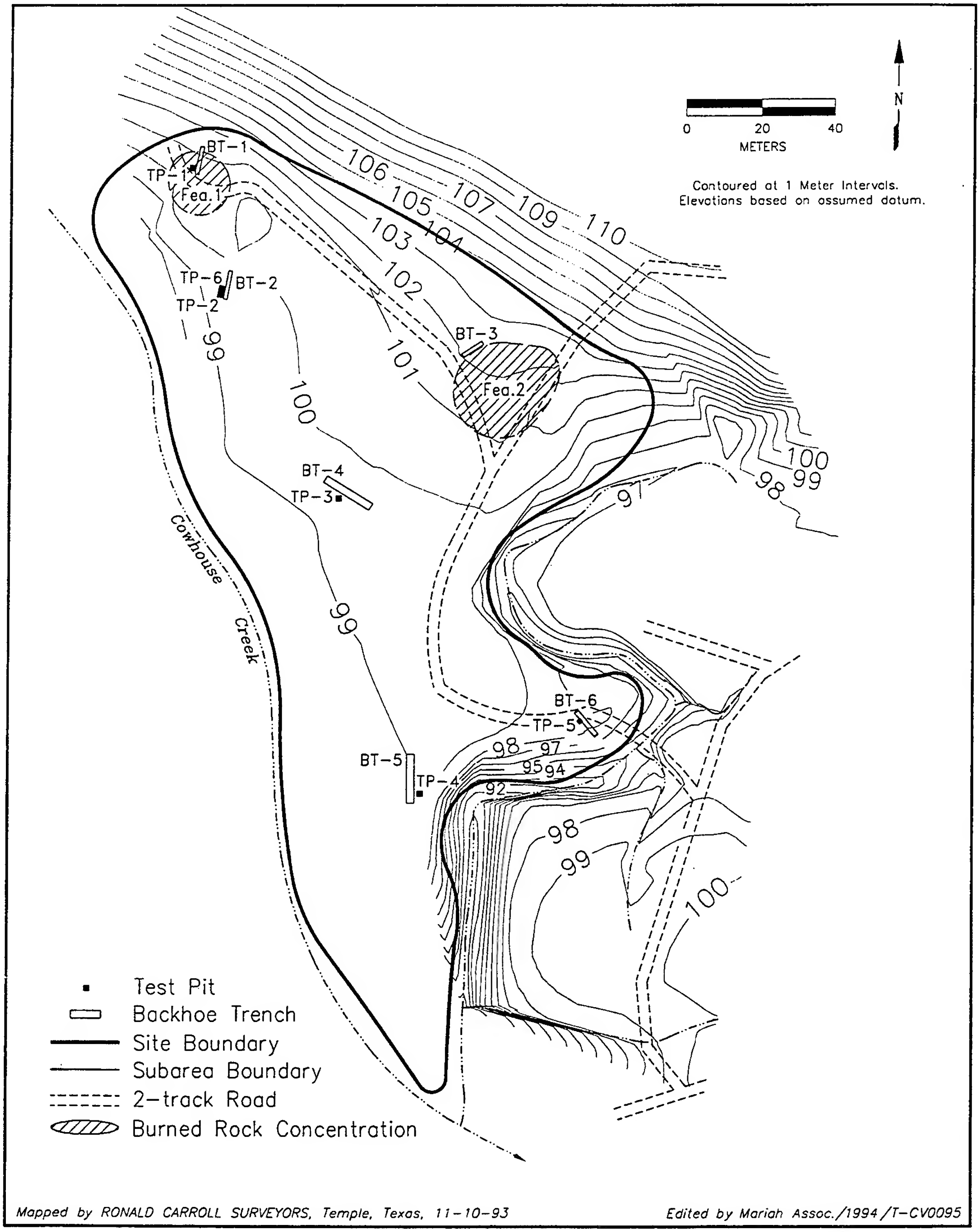

Figure 6.1 Site Map of 41CV95.

Figure 6.2 Overview of Site 41CV95, Looking West.

excluding the southernmost tip of the site where very young (but difficult to reach) sedimentary deposits are located (Trierweiler 1994:A699-A700).

6.1.1.3 New Work

Testing for NRHP evaluation consisted of six backhoe trenches (BTs 1 through 6) and six test pits (TPs 1 through 6), all of which were offset from a backhoe trench (Table 6.1). A total of 10 m^2 was manually excavated at the site. Recovered cultural material is summarized in Table 6.2.

Table 6.1 List of Treatment Units, 41CV95.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	5	0.8	240
1	BT 2	5	0.8	280
1	BT 3	5	0.8	250
1	BT 4	5	0.8	240
1	BT 5	5	0.8	280
1	BT 6	5	0.8	290
1	TP 1	1.0	1.0	100
1	TP 2	1.0	1.0	130
1	TP 3	1.0	1.0	120
1	TP 4	1.0	1.0	250
1	TP 5	1.0	1.0	290
1	TP 6	1.0	1.0	110

6.1.2 Results

Six trenches were excavated at this site in order to examine the site stratigraphy and to prospect for deeply buried occupations beyond the reach of previous shovel testing efforts (Figure 6.3). The preliminary results of this work suggest that the stratigraphy at this site is complex, and four alluvial stratigraphic units previously described by Nordt (1992) appear to be present: Georgetown,

Table 6.2 Artifact Recovery by Test Pit, 41CV95.

	None					TEST PIT 1					TEST PIT 2				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)
surface	12	1	13	11	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
1						0	0	2	0	2(0.3)	0	6	2[1]	0	1(0.1)
2						0	0	1	0	0(0)	1	0	16	1	3(0.1)
3						0	3	27	0	2(0.5)	0	0	23	0	34(7.5)
4						0	5	32	1	0(0)	0	0	16	0	35(13)
5						0	0	30	0	4(0.5)	1	0	6	0	47(46)
6						0	0	40	5	7(1.5)	0	0	4	0	30(38)
7						0	0	18	1	2(0.5)	0	0	1	0	5(3)
8						0	0	2	0	8(1)	0	0	0	0	5(1)
9						1	0	0	0	1(0.3)	0	0	3	0	4(1)
10						0	0	0	0	0(0)	14	2	2	0	0(0)
11											101	0	0	0	6(1)
12											33	0	1	0	4(1)
13											11	0	0	0	4(1)
TOTAL	12	1	13	11	0(0)	1	8	152	7	26(4.6)	161	8	74	1	178(111.7)

	TEST PIT 3					TEST PIT 4				
LEVEL	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
surface	0	0	0	0	0(0)	0	0	0	0	0(0)
1	0	0	1	0	0(0)	0	0	0	0	0(0)
2	0	1	0	1	1(0.1)	0	0	0	0	0(0)
3	0	0	1	0	0(0)	0	0	0	0	0(0)
4	0	0	0	0	0(0)	0	0	1	0	0(0)
5	0	0	0	0	1(0.1)	0	0	0	0	0(0)
6	0	0	6	1	6(1)	0	0	0	1	5(1)
7	0	0	2	1	1(0.5)	0	1	0	1	21(4)
8	0	0	7	0	3(0.5)	0	2	2	0	41(10)
9	0	0	5	1	7(1)	0	0	2	0	32(4)
10	0	0	0	0	10(0.3)	0	0	2	0	1(0.1)
11	0	0	1	0	3(0.4)	0	0	0	0	2(0.3)
12	0	0	0	0	0(0)	2	0	1	0	0(0)
13						0	0	0	0	2(0.3)
14						0	0	1	0	0(0)
15						1	0	1	0	5(0.5)
16						5	0	1	0	4(0.3)
17						3	0	0	0	2(0.3)
18						5	0	0	0	4(0.3)
19						4	0	0	0	0(0)
20						1	0	1	0	0(0)
21						2	0	1	0	1(0.1)
22						0	0	0	0	1(0.5)
23						1	0	0	0	0(0)
24						0	0	0	0	0(0)
25						1	0	0	0	0(0)
TOTAL	0	1	23	4	32(3.9)	25	3	13	2	121(21.7)

	TEST PIT 5					TEST PIT 6				
LEVEL	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
surface	0	0	0	0	0(0)	not screened				
1	0	0	0	0	0(0)					
2	0	0	0	0	0(0)					
3	0	0	0	0	0(0)					
4	24	0	3	0	0(0)					
5	0	0	4	0	0(0)					
6	1	0	7	0	3(0.5)					
7	0	0	3	0	8(2.5)					
8	0	0	5	0	17(2)	0	0	0	0	0(0)
9	0	0	0	0	7(1)	1	0	0	0	0(0)
10	0	0	0	0	64(16)	54	0	0	0	12(11.5)
11	2	0	1	0	0(0)	92	0	0	0	7(2)
12	4	0	0	1	18(6)					
13	3	0	6	1	1(0.3)					
14	0	0	0	0	0(0)					
15	0	0	0	0	8(8.5)					
16	0	0	0	0	0(0)					
17	0	0	0	0	0(0)					
18	0	0	0	0	0(0)					
19	0	0	0	0	0(0)					
20	0	0	0	0	1(0.3)					
21	0	0	0	0	0(0)					
22	0	0	0	0	0(0)					
23	0	0	0	0	0(0)					
24	0	0	0	0	0(0)					
25	0	0	0	0	0(0)					
26	0	0	0	0	0(0)					
27	0	0	0	0	0(0)					
28	0	0	0	0	0(0)					
29	0	0	0	0	0(0)					
30										
TOTAL	34	0	29	2	127(35.1)	147	0	0	0	19(13.5)

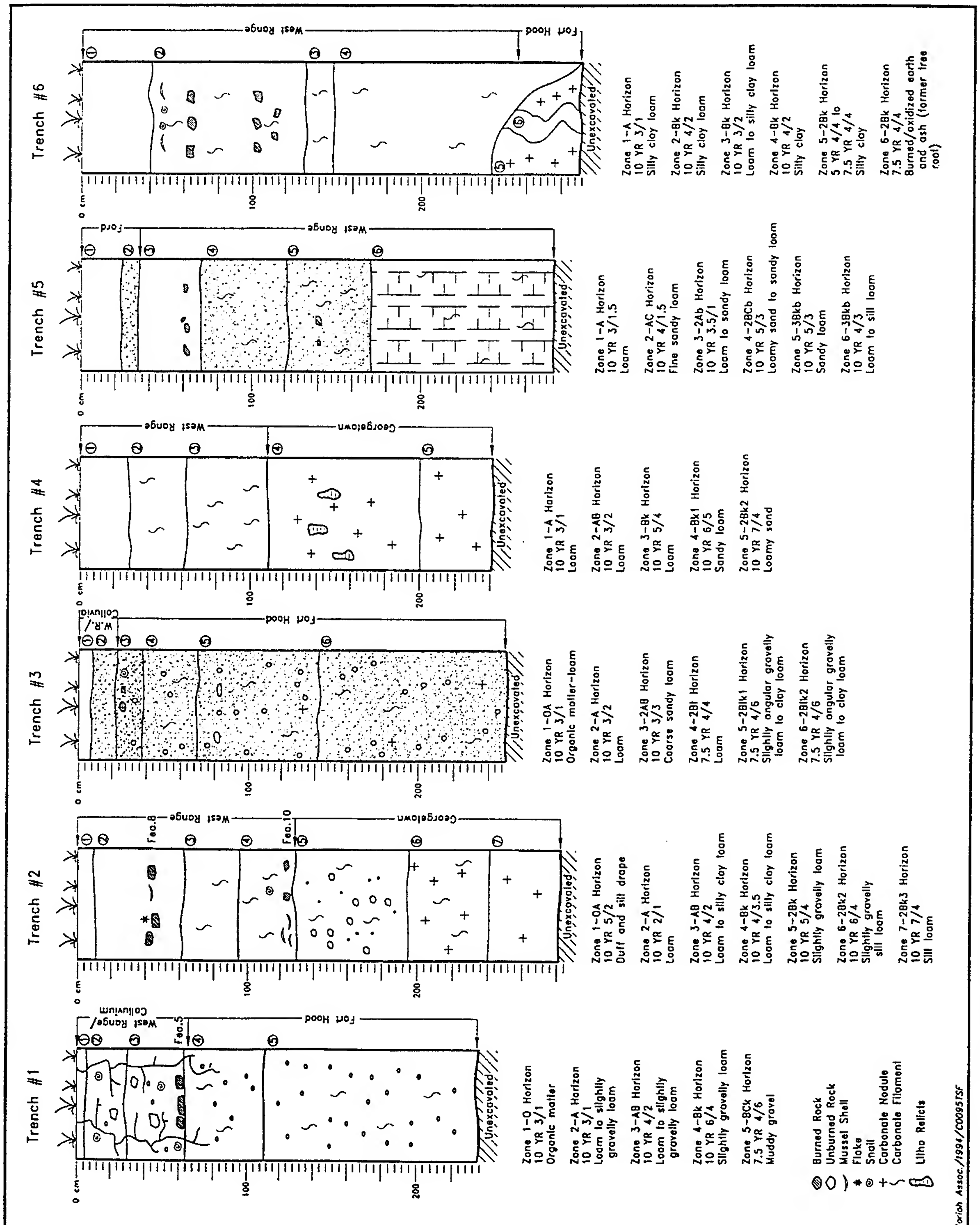

Figure 6.3 Measured Sections, BTs 1 through 6, 41CV95.

Fort Hood, West Range, and Ford. The youngest unit, the Ford alluvium, is present beneath the T_0 surface adjacent to the Cowhouse Creek channel and was tentatively observed in only one trench (BT 5) on the leading edge of the T_1 surface at the site's southern end. A significant volume of West Range alluvium was tentatively identified along the leading edge of the T_1 surface at the site's southern end (BTs 5 and 6) and forming a thin (less than 1.5 m) veneer upon older fills across the site's northern portion (BTs 2, 1, 4, and possibly 3). The core of the site's northern half is composed of Georgetown alluvium which is best exposed south of the colluvial slope (e.g., BTs 2 and 4). Immediately adjacent to the colluvial slope, the Fort Hood alluvium is present, suggesting that this fill is inset into the top of the Georgetown alluvium in some places.

The oldest unit observed at the site, the Georgetown alluvium, is light yellowish brown to very pale brown in color, and often contains nodule-like inclusions that Nordt (1992) has identified as litho-relicts but may instead be carbonate nodules. This fill was observed in BT 2 below 130 cmbs and in BT 4 at depths in excess of 110 cmbs. The Fort Hood alluvium was observed in BT 3 below 22 cmbs, and was tentatively identified in BT 1 below 65 cmbs and in BT 6 below 240 cmbs. This fill typically exhibits 7.5YR hues, and in BT 3 possessed an A-Bt-Bk-Btk soil profile where the Bk horizon contained small carbonate masses (less than 3 mm in diameter).

The majority of the cultural material observed at the site was within a fill tentatively identified as the West Range alluvium. This fill exhibits 10YR hues and soils formed within this deposit possess A-AB-Bk profiles. In BT 1 this fill was inferred to comprise the upper 65 cm of the solum and was mixed with colluvium. In BT 2, immediately downslope and south of BT 1, this fill was somewhat thicker and was estimated to include the top 130 cm of the profile. Trench 5 contained a significantly thicker exposure of West Range alluvium, but the exact boundary between the West Range and overlying Ford fills could not be confidently established. Significant breaks in the sediments were observed at approximately 120 and 33 cmbs, and the deposits below 120 cmbs were presumed to be West Range. A relatively thick wedge of fill that was inferred to be West Range was identified in BT 6 resting upon the Fort Hood alluvium at depths of 240 cmbs or greater. However, the deposits observed in this trench appear to include significant contributions from the unnamed drainage that forms the eastern border of the site; an attribute that complicated interpretation of these sediments.

No significant deposits of the Ford alluvium were exposed by the trenching, although some alluvium believed to be the Ford was noted in BT 5. The most significant accumulations of this deposit were present beneath the T_1 surface at the confluence between the unnamed tributary and Cowhouse Creek at the southern end of the site, and were inaccessible to the backhoe during testing due to the narrow width and instability of the landform.

Feature 1 consists of a burned rock concentration (about 15 m in diameter) that has been scattered along a dirt road. Some of the burned rock is partially covered by short shrubs. Trench 1 was placed perpendicular to the toe of the colluvial slope on the northwestern portion of the site where F 1 is located. The profile of the trench revealed an A horizon containing several burned and unburned rocks. A hearth (F 5) was observed at the contact between the A horizon (presumably West Range alluvium and colluvium) and the older (Fort Hood alluvium) deposits.

Test pit 1 was offset from BT 1 to investigate Fs 1 and 5, respectively, and was excavated to 100 cmbs. The upper 20 cm of the pit yielded only a couple of burned rocks and flakes, suggesting that F 1 is restricted to the surface. Although the frequency of burned rocks remained sparse from 20 to 50 cmbs, numerous flakes and a few bone fragments were found (Table 6.2). A hearth (F 5) was found at 50 to 70 cmbs. Approximately half of F 5 was removed by the excavation of BT 1,

but a semicircular portion measuring 68 cm by 40 cm remained intact (Figure 6.4). The remaining portion was composed of about 35 tightly clustered burned rocks (12 kg), ranging in size from 3 to 15 cm in length x 3 to 6 cm in width (Figure 6.5). In profile, the rocks exhibited a shallow basin shape, although the base elevations of the rocks exposed during excavation are nearly identical and occupy a horizontal plane. No oxidized soil was observed in the feature, and only a slight discoloration of the soil around the rocks and a few charcoal flecks could be attributed to the feature. Charcoal recovered from the flotation sample proved to represent live oak, indicating that this was at least one of the fuels used in the feature. Numerous burned rocks and flakes, a few charcoal flecks, and an Ensor point mantled the presumed paleosurface outside the boundary of the feature.

Below F 5, lithic frequencies declined dramatically, with only a few flakes and burned rocks recovered from 70 to 90 cmbs. A mussel shell was the only item found at the bottom of the test pit from 90 to 100 cmbs.

Trench 2 was placed on the alluvial terrace south of BT 1 and perpendicular to Cowhouse Creek. Several lithics (mainly core flakes and some biface fragments) and mussel shells were collected from the backdirt pile. At least two cultural zones were observed in the trench profile. The upper component included a burned rock midden (F 8), and the lower component contained a possible hearth (F 10), with an associated mussel shell concentration. Both appeared to be contained in West Range alluvium.

Test pit 2 was placed above the two occupations observed in the BT 2 profile and excavated to 130 cmbs. The top level of the test pit yielded a few flakes, a burned rock, and several deer-sized bones (Table 6.2). The frequency of lithic artifacts increased substantially from 10 to 20 cmbs, with several flakes, and a few burned rocks and a couple mussel shells being found. The top of a burned rock midden (F 8) was encountered from 20 to 30 cmbs and the base was reached at 66 cmbs.

Within the excavated levels of F 8 (Figure 6.6), the frequency of burned rocks rose steadily in the upper levels, peaked at the central level, and decreased to the base. A total of 151 gray and reddish-pink burned rocks (107.5 kg) were recovered from the feature. The recovery rate ranged from 34 pieces (7.5 kg) in the upper level, to 47 pieces (46 kg) in the central level, to 5 pieces (3 kg) in the base level. The majority of rock was tabular in shape, although subangular rocks were present. Rock size ranged from gravels to pieces up to 20 cm long x 5 cm wide. The majority of the bottom rocks lie on a southeast-sloping plane that dips toward Cowhouse Creek. Within the test pit, rocks were less densely clustered in the northwest and became both vertically stacked and more densely clustered toward the southeast corner of the test pit. No other internal structure was evident. No staining was found in the feature area, nor was any oxidized soil encountered. Flakes, bone fragments, fragments of indeterminate charred wood, and a mussel shell were recovered from the feature.

Below F 8, lithic artifact density decreased dramatically from 60 to 90 cmbs, with recovery including a few burned rocks, flakes, and bone fragments. The southern portion of a probable deflated hearth (F 10), with an associated mussel shell concentration, was encountered from 93 to 110 cmbs.

Feature 10 was partially removed by the excavation of BT 2, but the remaining rocks covered a linear area 100 cm east to west x 55 cm north to south, and may extend east and west of the test pit limits. Within the test pits, the feature was composed of about 25 burned rocks (14.5 kg), of which six were large, burned limestone slabs averaging approximately 20 cm long x 10 cm wide. Two of these rocks were slightly dipping away from each other, while other rocks in the feature were almost completely horizontal, suggesting little disturbance. Several rocks also

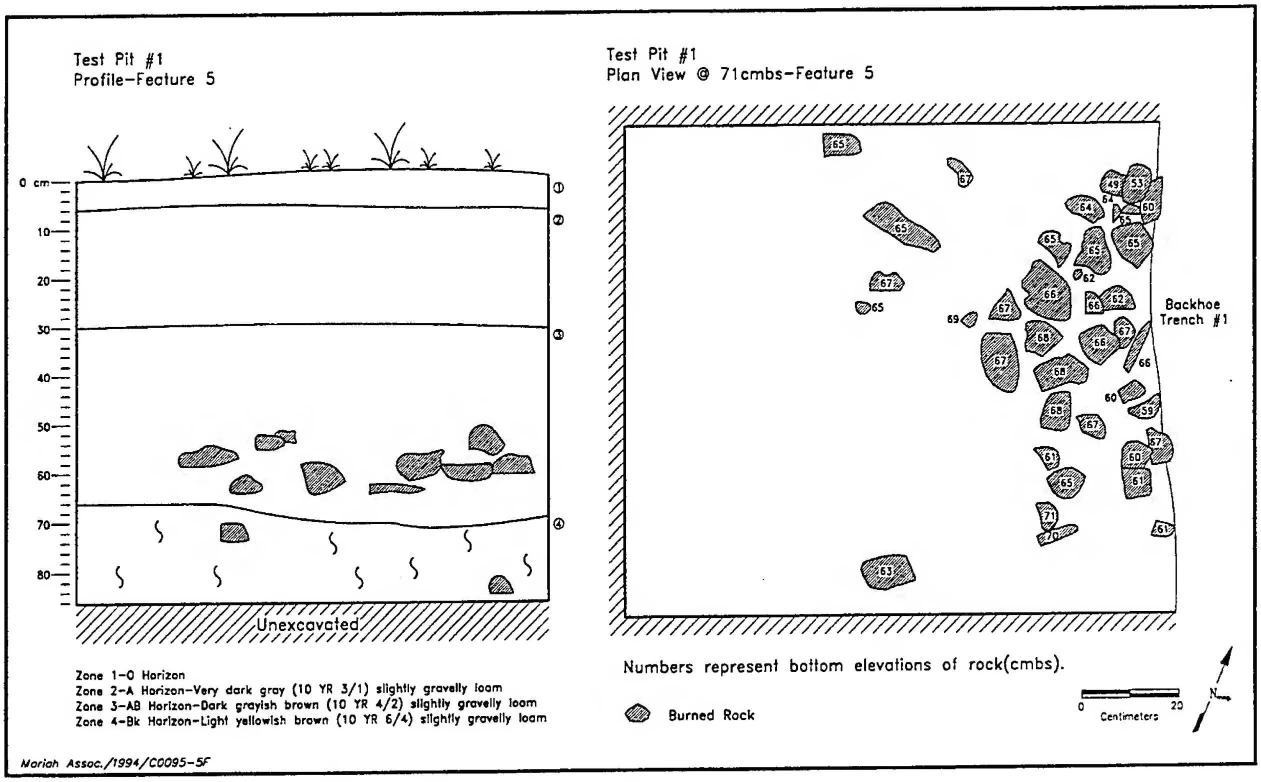

Figure 6.4 Profile of North Wall and Plan of F 5, 71 cmbs, TP 1, 41CV95.

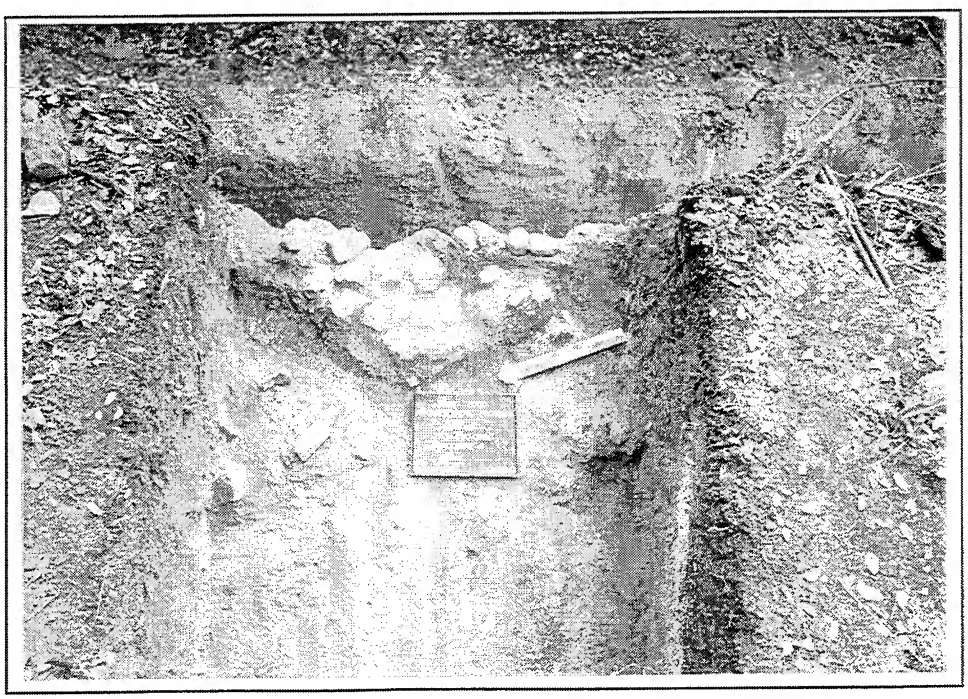

Figure 6.5 Feature 5, 41CV95, Looking East.

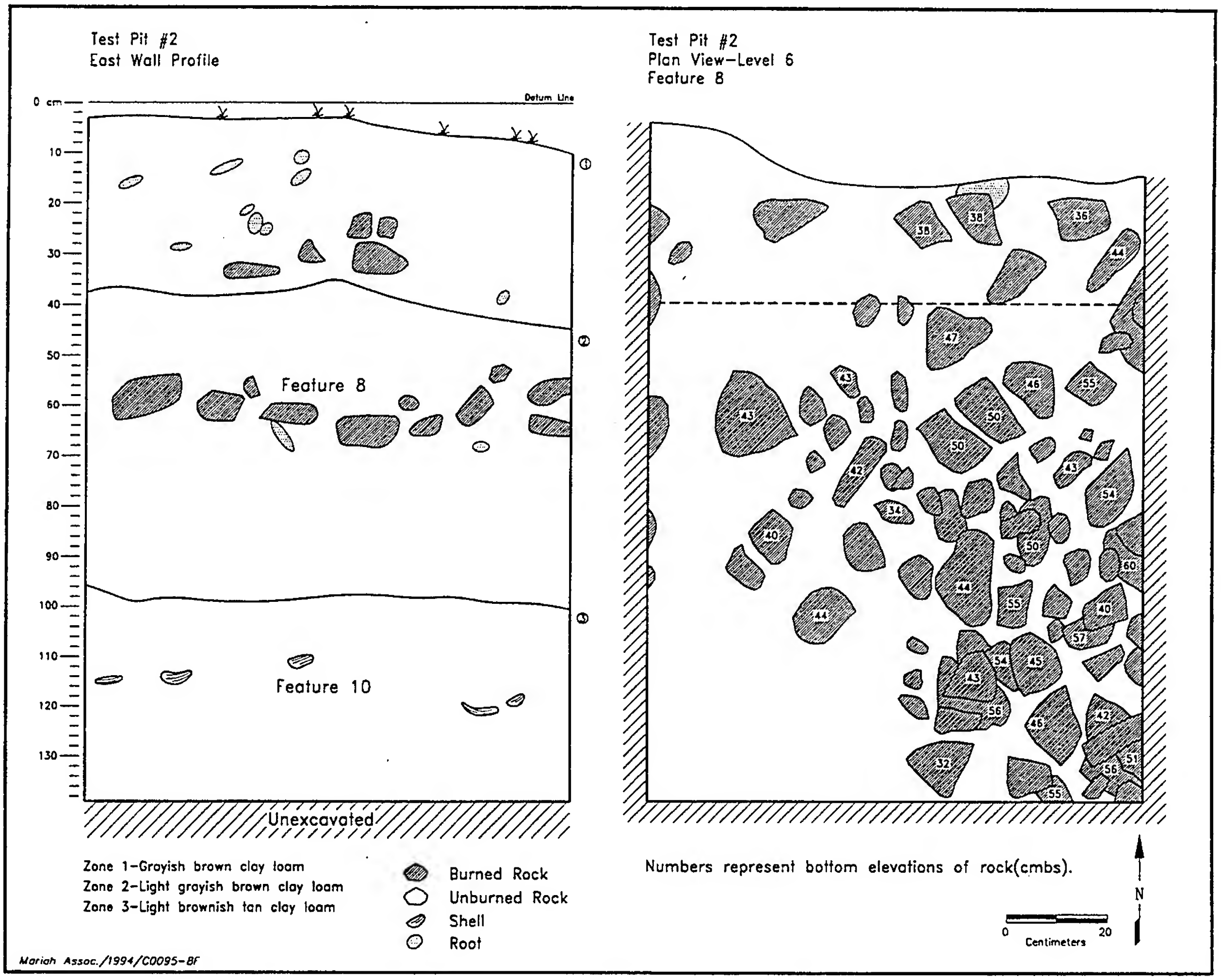

Figure 6.6 Profile of East Wall and Plan of F 8, 60 cmbs, 41CV95.

appeared to have been fire-cracked in place and shattered upon removal. No staining was observed in the feature area but more than 60 mussel shell umbos were recovered. Most of the mussel shells occurred at an elevation equal to the base of the burned rocks, suggesting the mussel shells were exploited at the same time as the construction or use of the apparent hearth. A few flakes and a bone fragment were also associated with the hearth. Although the base of the hearth was located at 110 cmbs, numerous mussel shells and a few burned rocks continued to be found from 110 to 130 cmbs.

Test pit 6 was placed adjacent to TP 2 for further exploration of F 10 and was excavated to 110 cmbs. The upper levels of this test pit had been removed during backhoe trenching. Therefore, excavation began at 80 cmbs. From 80 to 90 cmbs, only one mussel shell was found. The northern portion of F 10 was located from 90 to 110 cmbs. As within TP 2, several burned rocks, numerous mussel shells, and a flake were associated with the hearth in TP 6.

Very large numbers of *Rabdotus* sp. snail shells were found in the upper 30 cm of TP 2, including more than 100 shells in the upper 10 cm of F 8

(20 to 30 cmbs). Modest numbers of snails (generally 15 or more) occurred in the other levels. No temporal diagnostics were found in TP 2 or TP 6, little charcoal was observed, and none was collected from these two units.

Feature 2 is a burned rock concentration (about 20 m in diameter) that has been scattered by vehicles at the intersection of three roads. The feature has been highly disturbed. Trench 3 was placed near F 2. The trench profile revealed a small amount of burned rock about 25 to 30 cmbs, approximately at the contact between the Fort Hood alluvium and younger (West Range) alluvial/colluvial deposits. A test unit was not placed on BT 3 in order to allocate units to other locations.

Trench 4 was placed between the road that traverses the northern portion of the site and the edge of the alluvial terrace of Cowhouse Creek. Several burned rocks and lithics were visible in the upper meter of deposits, which are interpreted to be of West Range age.

Test pit 3 was placed adjacent to BT 4 and excavated to 120 cmbs. In the upper levels of the test pit from 0 to 50 cmbs, a bone fragment and a few flakes, and burned rocks were found. An increase of flakes and burned rocks occurred from 50 to 110 cmbs. Burned rock was found in each of these levels and flakes were found in the majority of these levels, indicating a series of stratified occupations. In addition to these artifacts, a Darl point was recovered from 50 to 60 cmbs.

Trench 5 was placed perpendicular to Cowhouse Creek at the southern end of the site. It revealed a deep deposit of brown silty loam interpreted as a veneer of Ford Alluvium over weakly stratified West Range Alluvium. The contact between these two units was indistinct, but appeared to occur somewhere between 30 and 170 cmbs. Burned rock and a few lithics were observed on the trench backdirt pile and a possible hearth (F 4) was located in the profile at approximately 80 cmbs.

Test pit 4 was placed directly above F 4 and excavated to 250 cmbs. The upper 50 cm of TP 4 was nearly sterile, yielding only a single bone fragment. Artifact recovery began to increase at 50 to 60 cmbs, and with a few burned rocks, flakes, and the distal portion of an arrow point being found. Feature 4, which consisted of a partially deflated hearth, was encountered at 59 cmbs and extended to 93 cmbs (Figures 6.7 and 6.8). The feature was composed of 99 burned rocks (19 kg), no larger than 10 cm in diameter, covering an area 85 cm north to south x 88 cm east to west. The interior burned rocks were stacked directly on top of one another, while others toward the edges were separated by a few centimeters of soil. The rocks all dipped in various directions, were not on any particular horizontal plane, and no basin was discerned to account for its 34 cm thickness. Several rocks were separated from the feature to the southeast. No charcoal staining or oxidized earth was observed within the feature. Several flakes, and bone fragments, and a mussel shell were recovered from the feature. A radiocarbon age of 1080 ± 60 BP (Beta b-75150) was obtained from an AMS analysis of charcoal recovered from flotation of the feature matrix, suggesting that (1) the fill below approximately 30 to 50 cmbs is equivalent to the upper West Range Alluvium of Nordt (1992), and (2) the feature dates to the early part of the Late Prehistoric.

Below F 4 (93 to 140 cmbs), relatively low frequencies of lithics, burned rock, and mussel shells were recovered. Artifact frequencies increased from 140 to 180 cmbs. Several burned rocks and mussel shells and a few flakes were found in these levels, which suggests a lower occupation is present. From 180 to 250 cmbs, in a more highly structured unit that may represent the lower West Range fill, a few mussel shells, burned rocks, and a few flakes continued to be found to the base of the test pit.

Trench 6 was placed perpendicular to the unnamed tributary at the southeastern edge of the site. The trench revealed a deep deposit of brown silty loam

to a depth of almost 3 m. The majority of this material was interpreted as West Range Alluvium, although an older, dipping deposit interpreted as Fort Hood Alluvium was detected below 250 cmbs. A series of burned rock strata representing at least three stratigraphically distinct occupations as found in the north end of the trench. A burned rock feature was discovered in each of these lenses (designated Fs 3, 6, and 7 from top to bottom), and a fourth stratified feature (F 9), while not visible in the trench profile, was subsequently discovered during excavation of the adjacent test pit (Figure 6.9). In addition, a heavily oxidized circular area (representing a probable tree burning episode) was observed near the bottom of the trench, adjacent to the terrace edge.

Test pit 5 was placed at the north end of BT 6 and excavated to 290 cmbs through the stratified occupations. The upper 40 cm of TP 5 contained a single bone fragment and a couple of mussel shell umbos. A few flakes and mussels shells were found at 40 to 50 cmbs. The first lens of burned rock observed in BT 6 profile was encountered at

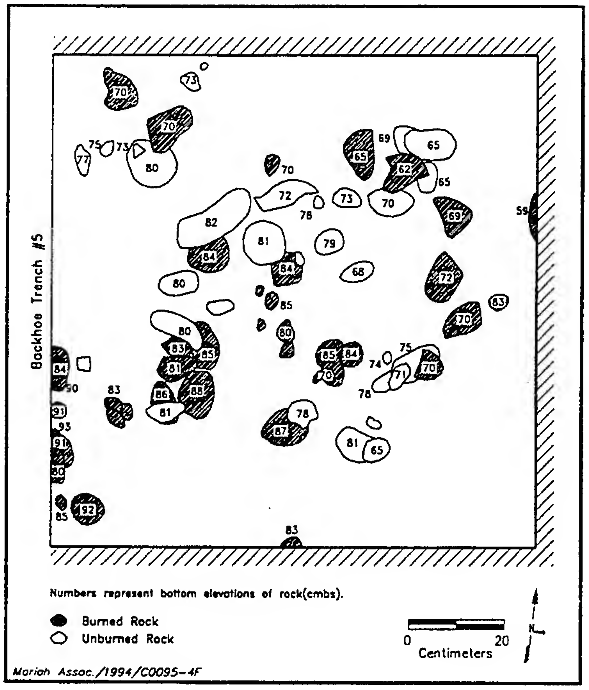

Figure 6.7 Plan of F 4, 90 cmbs, TP 4, 41CV95.

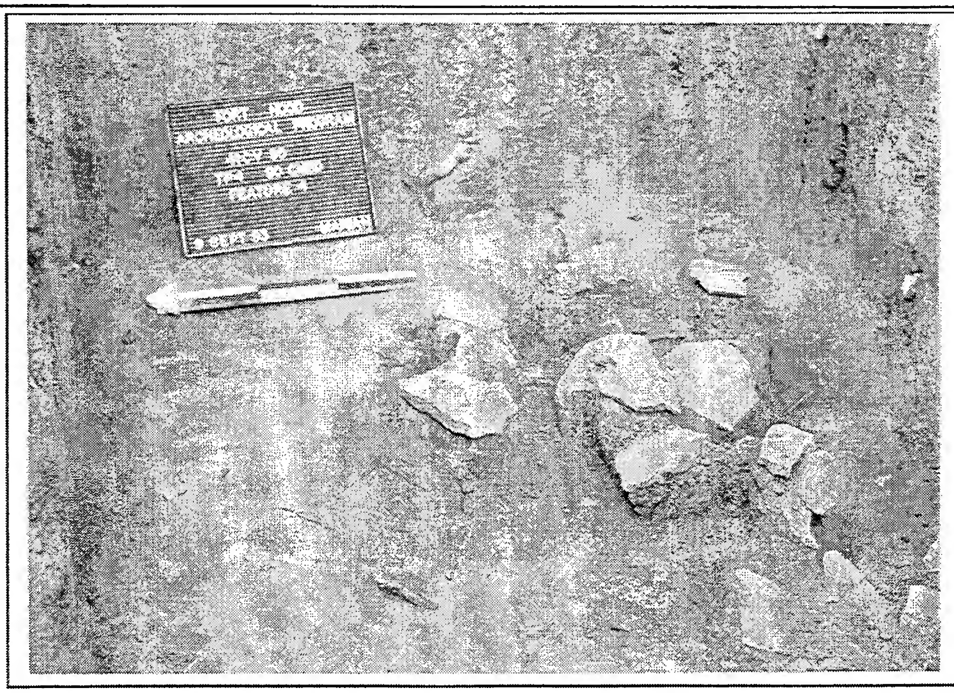

Figure 6.8 Feature 4, 41CV95, Looking East.

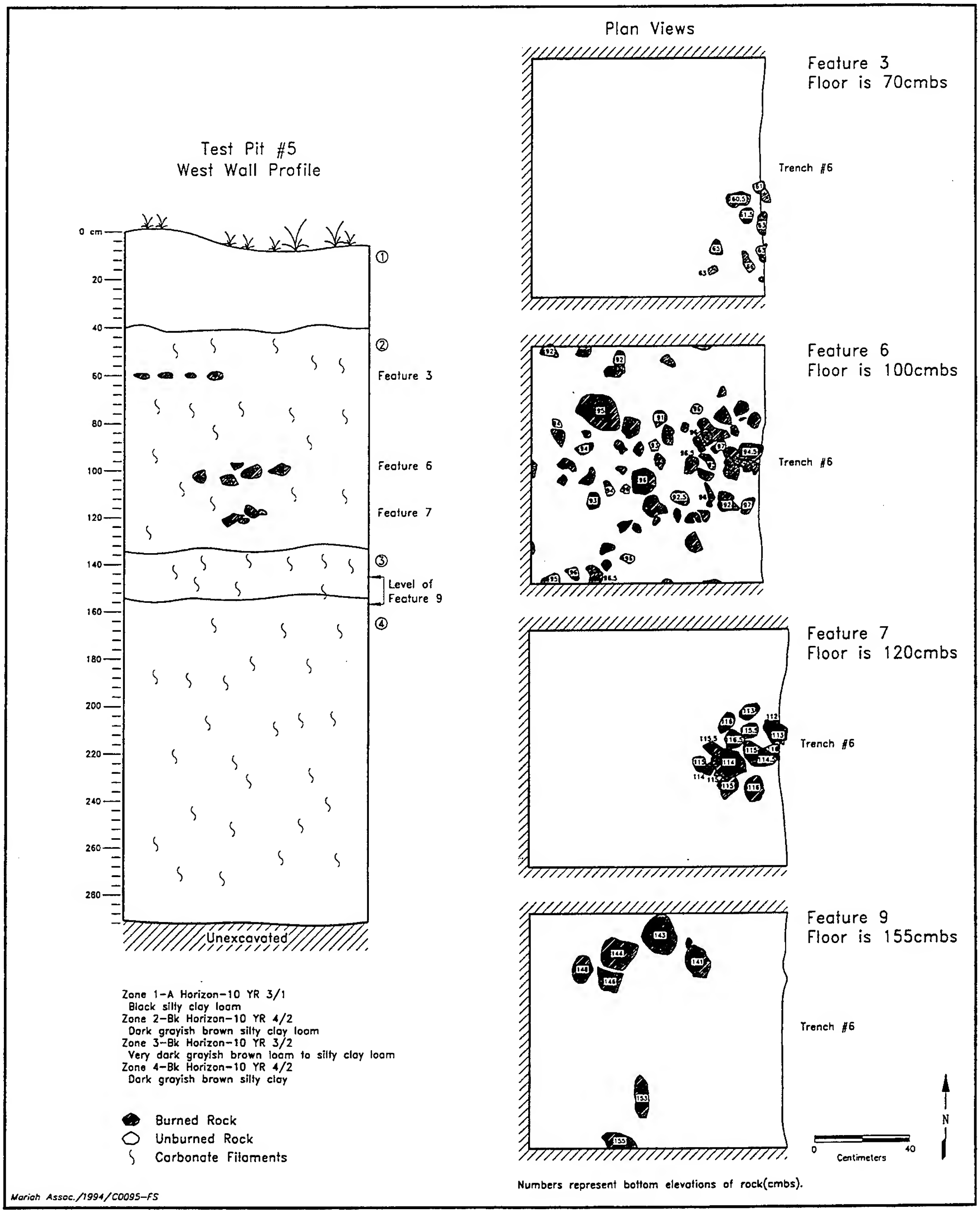

Figure 6.9 Profile of West Wall and Plans of Fs 3, 6, 7, and 9, TP 5, 41CV95.

50 to 60 cmbs. Relatively few artifacts were recovered from the top of this lens. A small hearth (F 3) was encountered at 60 to 65 cmbs.

Feature 3 was partially removed by the excavation of BT 6 (Figure 6.10) but a 50 cm by 25 cm portion of the hearth remained intact. The remaining portion consisted of nine relatively small burned rocks (2.5 kg) that appeared to be constructed on a planar surface. The rocks were arranged horizontally on a slight slope dipping toward the southwest to the nearby unnamed drainage of Cowhouse Creek. No staining or oxidized soil was found around the rocks but they were fairly tightly clustered, and the fact that no other rocks were found in the unit at this level implies that the feature was a small hearth. A few flakes were associated with the feature. An AMS radiocarbon age of 1410 ± 60 BP was obtained from a small charcoal fragment recovered from the flotation sample collected from F 3, suggesting that the feature dates from the latter Transitional Archaic or earliest Late Prehistoric.

Below F 3, few lithics and several burned rocks continued to be found from 70 to 90 cmbs. A burned rock concentration (F 6) was encountered at 91 to 97 cmbs, within the second lens of burned rock observed in the BT 6 profile. Initially, the upper two lenses of burned rock observed within the trench profile were thought to be two widely separated occupations, however, excavation revealed a series of stratified occupations beginning at 50 cmbs and extending to the burned rock concentration (F 6) at 91 to 97 cmbs.

Feature 6 extended beyond the limits of TP 5 and into the opposite wall of BT 6. Within the test pit, the feature contained 64 (16 kg) burned rocks, most of which were angular in shape. A single layer of tightly grouped rocks was present at the eastern edge of the test pit which graded to a more open scatter to the western edge. The size of the rock ranged from gravels to pieces reaching 20 cm in length. As within F 3, the rocks were generally on a plane sloping to the southwest toward the unnamed drainage. No charcoal staining or oxidation was found in association with F 6, but small fragments of charred live oak wood were recovered from the flotation sample, suggesting that live oak was at least one of the species used as fuel in the feature.

A dramatic decrease of cultural material occurred at 100 to 110 cmbs, where only a single flake and a few mussel shells were recovered. A hearth (F 7) was located at 109 to 117 cmbs, within the third lens of burned rock observed in BT 6 profile. Feature 7 consisted of a small, basin-shaped hearth (Figure 6.11). The feature was impacted by the excavation of BT 6, but a 42 cm by 40 cm portion containing 18 tabular and angular burned rocks (6 kg) remained intact. These rocks were fairly consistent in size and averaged 8 to 10 cm in length. Many of the rocks were in direct contact, suggesting high integrity to the feature. No staining, oxidized earth, or charcoal was found in association with the feature; however, flotation of the matrix produced small fragments of charcoal identified as live oak. The base of the rocks, like Fs 3 and 6 above, indicates a slight slope toward the unnamed drainage to the southwest. A few mussel shells and a single flake were associated with the hearth.

Between Fs 6 and 7 (97 to 109 cmbs), a dense, 12 cm thick lens of land snails (more than 200 specimens of mostly *Rabdotus* sp.) was present. The snails are probably not cultural, but may indicate creation of a highly favorable, localized microenvironment in conjunction with the use and burial of Fs 6 and 7.

Again, a decrease of cultural material occurred from 120 to 140 cmbs. The fourth feature (F 9) located within TP 5 was found at 139 to 155 cmbs. This feature, unlike the features found above, was not visible in the profile of BT 6. Feature 9 consisted of a concentration of burned rock or probable hearth. The feature was composed of six burned tabular and subangular limestone slabs (6.5 kg), ranging from 10 to 20 cm long x 3 to 5 cm thick. The rocks were arranged in an approximately semicircular configuration on a

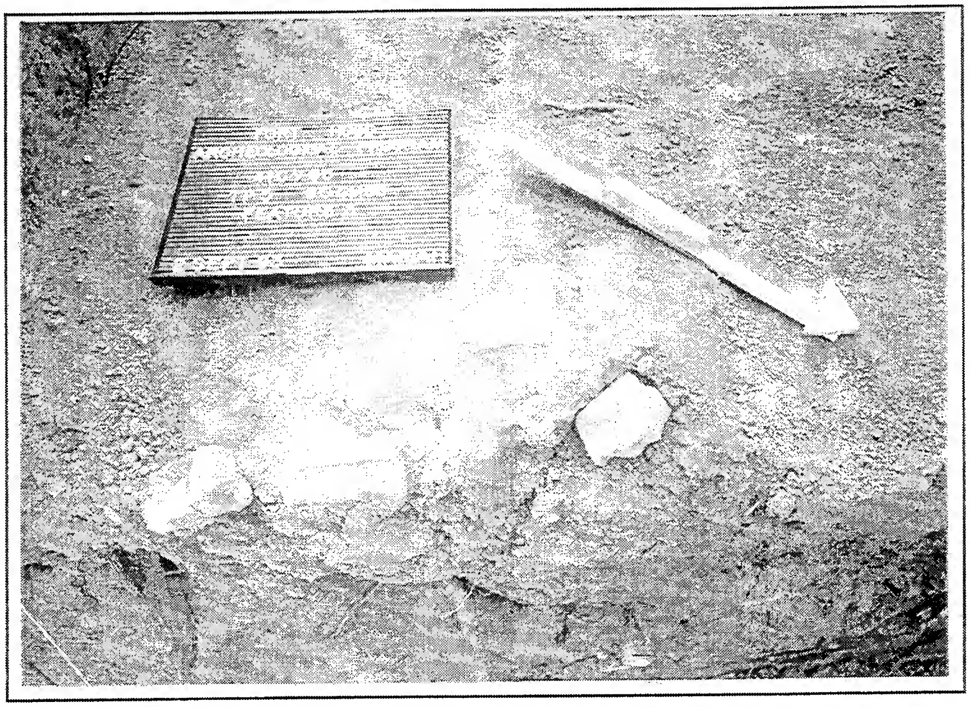

Figure 6.10 Feature 3, 41CV95, Looking West.

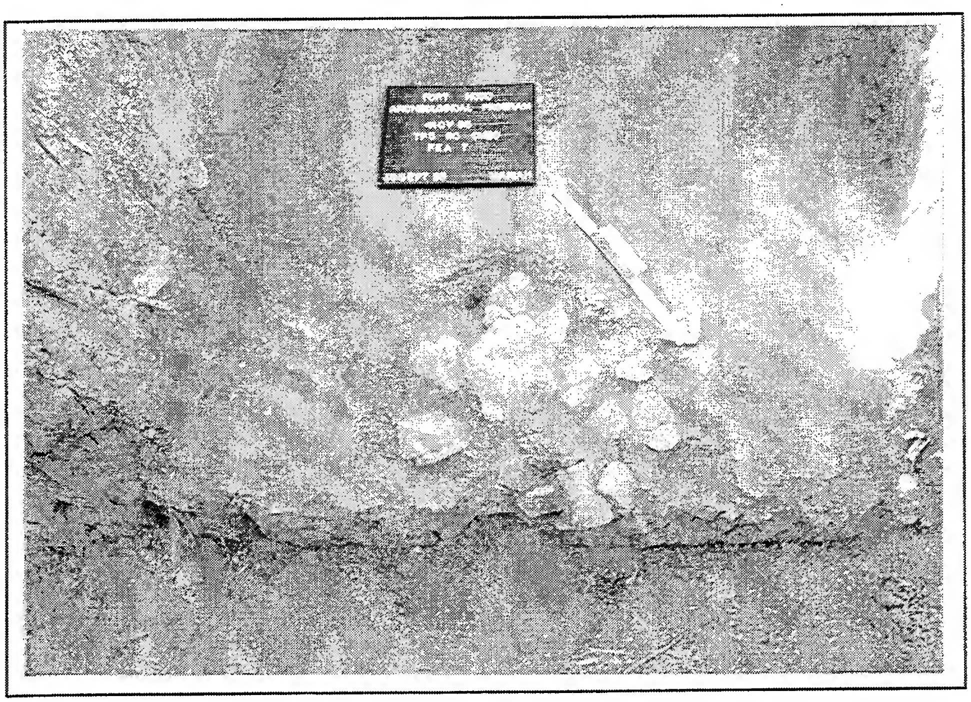

Figure 6.11 Planview of F 7, 41CV954, Looking Southwest.

sloping plane that dips toward the unnamed tributary of Cowhouse Creek to the southwest. Several burned rocks were the only artifacts associated with the feature.

The stratigraphy below F 9 from 150 to 290 cmbs was virtually devoid of cultural material, yielding a single burned rock from 190 to 200 cmbs.

Two dart points and one untyped arrow point of three identifiable chert types were recovered from the excavations (Table 6.3). Two of these were associated with features. The remaining lithic assemblage includes a multiple platform core and various chipped stone tools; approximately one-third of these tools are made of Cowhouse Mottled chert with flecks (Table 6.4). Also included in these tools is a quartzite hammerstone and two crushing/abrading implements. These crushers are morphologically similar to choppers but are lighter in weight and have a more restricted surface of wear. Taken as a group, the tools are made of 16% Southeast Range chert, 12% North Fort, 28% Cowhouse, and 44% indeterminates.

Twelve identified chert types and seven indeterminate chert categories were included in the debitage sample obtained from 41CV95 (Table 6.5). Overall, more than 14% of the overall assemblage was identified. All of the identified types occurred in less than expected frequencies and indeterminates occurred in greater than expected frequency when the entire assemblage was considered, while exclusion of the indeterminates resulted in every identified type falling within the expected range except Cowhouse Mottled with Flecks that was higher than expected (Table 6.6). All four chert provinces on base are represented in the identified fraction. The Cowhouse province is represented by four types (Cowhouse Mottled, Cowhouse Mottled/Flecked, Cowhouse Mottled/Banded, and Cowhouse Striated) that comprise 31.1% of the identified total; the North Fort province is represented by three types (Fort Hood Yellow, Fort Hood Gray, and Gray/Brown/Green) that represent 42% of the total; the Southeast Range province is represented by four types (Heiner Lake Tan, Heiner Lake Translucent Brown, Fossiliforous Pale Brown and Heiner Lake Blue) that comprise 24% of the total; and the West Fort province is represented by one type (Anderson Mountain Gray) that represents 2.2% of the total. However, Heiner Lake Translucent Brown (HLTB) is also known to occur in the Cowhouse Creek bedload. If the HLTB material from the site is assumed to be obtained from the channel instead of the Southeast Range province, the relative percentages are adjusted to 33% from the Cowhouse Province and 22% from the Southeast Range.

As usual, the modal peak in size of the identified material (1.8 to 2.6 cm) is larger than the modal peak of indeterminates (0.5 to 0.9 cm), reflecting the greater potential for identification of the larger flakes. Although flakes were recovered in all size categories, a relatively large percentage (62%) of the total assemblage was less than 1.2 cm in size, suggesting that lithic manufacture focused on latter-stage reduction. This interpretation is not supported by the cortex data, however, as 29.6% of the assemblage were cortical flakes, including primary decortification flakes, which comprised more than 2% of the total assemblage (Table 6.7). Cortex abrasion is apparent on 26% of the cortical flakes, absent on 17%, and indeterminate on 55%, suggesting that the Cowhouse channel was a significant source for raw material.

A small number of unidentifiable bone fragments, a few mussel shell umbos, and a large number of unidentifiable mussel shell fragments were recovered from the site (Table 6.8). At least six distinct species of bivalves, representing micro-environments ranging from very deep, clear pools to relatively shallow, flowing water and from firm sandy to soft muddy substrates are represented in the assemblage. This range of species suggests that a variety of collection localities along Cowhouse Creek and, possibly, some of its smaller tributaries, are represented in the assemblage.

6.1.3 Conclusions and Recommendations

The majority of the cultural deposits observed at this site appear to be contained within the West Range alluvium. Along the northwestern end of the site, all of the cultural deposits are encased in a thin veneer of alluvium that probably represents a slowly aggrading surface during the late Holocene. At the southern end of the site, the West Range alluvium is significantly thicker, resulting in better stratigraphic separation of the deposits. All of the cultural material observed in this fill occupies a medial to distal overbank setting. Other than the two surficial features (Fs 1 and 2), the cultural material associated with F 4 in BT 5 is the only material excavated that is believed to be of Late Prehistoric age. The only occupation at this site observed during testing which may predate the period of West Range sedimentation is the burned rock scatter in BT 3, which is situated at the top of the Fort Hood alluvium.

Table 6.3 Projectile Points, AU 1, 41CV95.

	Lithic Material			
Point Type	06-HL Tan	15-Gry/Brn/Grn	17-Owl Crk Black	Total
Darl	0	0	1	1
Ensor	1	0	0	1
Other Arrow	0	1	0	1
Total	**1**	**1**	**1**	**3**

Table 6.4 Cores and Nonprojectile Point Lithic Tools, AU 1, 41CV95.

	Core Type	Tool Type													
Lithic Material	multiple platform	biface	Chopper	Crushing/Battering	end scraper	graver	Hammerstone	late stage biface	middle stage biface	preform	side scraper	uniface	utilized flake	wedge	Total
06-HL Tan	0	0	1	0	0	0	0	0	0	0	0	2	0	0	3
10-HL Blue	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
14-FH Gray	0	0	0	1	0	0	0	0	0	0	1	0	0	0	2
17-Owl Crk Black	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
22-C Mott/Flecks	0	1	1	0	0	0	0	0	2	0	0	1	1	1	7
Indet Dk Brown	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Indet Dk Gray	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Indet Lt Brown	0	0	0	0	1	1	0	1	0	1	0	1	0	0	5
Indet Lt Gray	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Indet Misc.	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Indet White	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Quartzite	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	**1**	**1**	**2**	**2**	**1**	**1**	**1**	**2**	**2**	**1**	**1**	**7**	**2**	**1**	**25**

In all, ten features were noted on 41CV95 during formal testing. Two of these features (Fs 1 and 2) appear to be surface features with little significant potential to contribute data to research problems outlined in the research design for Fort Hood (Ellis et al. 1994). However, eight features occurred in buried contexts that appear to have the potential to yield useful data according to research hypotheses outlined in Ellis (1993b). In addition to features, other evidence of stratified occupations occurs in the form of several subsurface peaks in the frequencies of artifacts not associated with known features.

Judging from the stratigraphic positions of Fs 3, 6, 7, and 9 in West Range alluvial contexts in TP 5, at least four occupations are present at the site. Judging from the stratigraphic position of F 4 in probable Ford alluvium in TP 4, at least one more occupation is present. The other buried features and peaks of artifact recovery in West Range contexts imply that additional occupations are highly likely, placing a series of occupations at the site from at least as early as the Middle Archaic through Late Prehistoric times. The presence of faunal materials (bone and mussel shell) indicates that cultural materials in these occupations can be correlated with tool assemblages (including burned rock) to model the structure and organization of subsistence technological systems (per Ellis 1994a). The presence of bone preserved in both feature and nonfeature contexts also implies that burial was relatively rapid, which further supports a judgment that occupations at the site are discrete and capable of contributing to relevant research issues. The site therefore has significant data potential with respect to the research design for Fort Hood. The potential to address issues in the research design is enhanced by the fact that a series of stratified occupations occurs at a single place, which allows for the possibility of charting diachronic changes in landscape use. Furthermore, there are substantial prospects for correlating evidence from 41CV95 directly with evidence from neighboring site 41CV1200.

Table 6.5 Debitage Recovery by Size and Material Type, AU 1, 41CV95.

	Size (cm)							
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	Total
Identified Types								
03-AM Gray	0	0	0	1	0	0	0	1
06-HL Tan	0	3	1	0	1	2	0	7
07-Foss. Pale Brown	0	0	0	0	0	1	0	1
08-FH Yellow	0	0	0	1	3	2	0	6
09-HL Tr Brown	0	0	0	0	1	0	0	1
10-HL Blue	0	0	1	0	1	0	0	2
14-FH Gray	0	0	0	1	2	4	1	8
15-Gry/Brn/Grn	0	0	0	1	2	2	0	5
18-C Mottled	0	0	0	0	3	0	0	3
22-C Mott/Flecks	0	0	0	2	6	1	0	9
23-C Mott/Banded	0	0	0	0	0	1	0	1
26-C Striated	0	0	0	0	0	0	1	1
Subtotal	*0*	*3*	*2*	*6*	*19*	*13*	*2*	*45*
Unidentified Types								
Indet Dk Brown	0	18	9	3	1	1	1	33
Indet Dk Gray	0	4	0	2	0	0	0	6
Indet Lt Brown	2	87	39	32	16	7	1	184
Indet Lt Gray	1	8	6	1	0	0	1	17
Indet Misc.	0	1	1	1	0	1	0	4
Indet Mottled	0	0	2	0	0	0	1	3
Indet White	0	6	0	3	1	1	0	11
Subtotal	*3*	*124*	*57*	*42*	*18*	*10*	*4*	*258*
Total	**3**	**127**	**59**	**48**	**37**	**23**	**6**	**303**

On this basis, site 41CV95 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because most known eligible components are relatively deeply buried, they are fairly well protected from training and other activities that affect only the surface of the site. However, some known occupations occur about 50 cm below the surface and could be damaged by activities involving heavy tracked and wheeled vehicles, especially if the ground is very wet. Adverse impacts also can accrue from acts of intentional

Table 6.6 Binomial Statistic Results, AU 1, 41CV95.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
03-AM Gray	1	14	33	less	1	8	expected
06-HL Tan	7	14	33	less	1	8	expected
07-Foss Pale Brown	1	14	33	less	1	8	expected
08-FH Yellow	6	14	33	less	1	8	expected
09-HL Tr Brown	1	14	33	less	1	8	expected
10-HL Blue	2	14	33	less	1	8	expected
14-FH Gray	8	14	33	less	1	8	expected
15-Gry/Brn/Grn	5	14	33	less	1	8	expected
18-C Mottled	3	14	33	less	1	8	expected
22-C Mott/Flecks	9	14	33	less	1	8	more
23-C Mott/Banded	1	14	33	less	1	8	expected
26-C Striated	1	14	33	less	1	8	expected
Total Indet	258	14	33	more	na	na	na

vandalism and from relatively shallow excavations that might be performed during training activities. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, (2) prevent mechanical or manual excavations by military personnel, and (3) minimize the impact of damage by heavy vehicles.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then current state of research, which may have progressed since 1993.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 175 m^2 in area. Known occupations with features and/or stratified assemblages occur at depths of approximately 25 to 80 cmbs in the area of TP 1; 25 to 130 cmbs in the area of TP 2 and TP 6; 50 to 90 cmbs in the area of TP 3; 50 to 200 cmbs in the area of TP 4; and 40 to 150 cmbs in the area of TP 5. Assuming that blocks averaging approximately 35 m^2 are placed in each of these areas, up to approximately 150 m^2 of manual excavation may be needed to mitigate the known occupations. This estimate assumes that carefully executed mechanical excavations will be used to remove overburden. Because unknown, intact buried occupations may occur at elevations higher than the known occupations, overburden removal should be carefully monitored. Discovery of such occupations would increase mitigation requirements by an unknown amount.

The total mitigation volume estimated above also does not include potential intact deposits that may be present at greater depths. Test excavations described in this report did not reach down into the deepest Holocene deposits at the site, so it is not known if significant intact deposits are present in deep stratigraphy. Therefore, if mitigation is required, it will be necessary to prospect for deeply buried cultural components that may add an unknown volume of manual excavations to the amount estimated above in order to mitigate the site. However, sounding for deeply buried components will involve mechanical excavation

Table 6.7 Debitage Cortex Characteristics by Material Type, AU 1, 41CV95.

	All Cortex			Partial Cortex				
Lithic Material	Abraded	Unabraded	Indeterminate	Abraded	Unabraded	Indeterminate	No Cortex	Total
Identified Types								
03-AM Gray	0	0	0	0	0	0	1	1
06-HL Tan	0	0	0	0	0	0	7	7
07-Foss Pale Brown	0	0	0	0	0	0	1	1
08-FH Yellow	0	0	0	1	1	1	3	6
09-HL Tr Brown	0	0	0	0	0	0	1	1
10-HL Blue	0	0	0	0	0	1	1	2
14-FH Gray	0	0	0	3	0	1	4	8
15-Gry/Brn/Grn	0	0	0	4	0	1	4	9
18-C Mottled	0	0	0	1	0	1	1	3
22-C Mott/Flecks	1	0	0	1	0	3	0	5
23-C Mott/Banded	0	0	0	1	0	0	0	1
26-C Striated	0	1	0	0	0	0	0	1
Subtotal	*1*	*1*	*0*	*11*	*1*	*8*	*23*	*45*
Unidentified Types								
Indet Dk Brown	0	0	1	4	1	7	21	34
Indet Dk Gray	0	0	0	0	0	0	6	6
Indet Lt Brown	0	2	2	7	9	26	138	184
Indet Lt Gray	0	0	0	1	0	1	15	17
Indet Misc.	0	0	0	0	0	2	2	4
Indet Mottled	0	0	0	0	1	1	1	3
Indet White	0	0	0	0	1	2	8	11
Subtotal	*0*	*2*	*3*	*12*	*12*	*39*	*191*	*259*
Total	**1**	**3**	**3**	**23**	**13**	**47**	**214**	**304**

that could severely compromise known intact deposits. Hence, if mitigation is required, it will be necessary to perform mitigation and sounding excavations in a carefully coordinated sequence that minimizes damage to known scientifically productive contexts and maximizes effectiveness of subsurface prospection.

6.2 SITE 41CV97

6.2.1 Introduction

In October and November 1993, Mariah conducted test excavations at site 41CV97. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.2.1.1 Location and Description

Site 41CV97 is located on Cowhouse Creek, and is included in the West Cowhouse site group. The site is situated on T_{1A} and T_{1B} terraces between Cowhouse Creek and the base of a colluvial slope (Figure 6.12). The site is bisected by an unnamed tributary, with an irrigation canal, a road, and berm parallelling the base of the colluvial slope (Figure 6.13). Maximum site dimensions are 350 x 150 m (about 52,500 m^2, or 13 acres). For purposes of this report, the site is considered part of the West Cowhouse site group.

6.2.1.2 Previous Work

George Thomas first recorded the site on 27 March 1976. Flakes were noted on an alluvial terrace of Cowhouse Creek, and a Marcos point was collected. The area was considered a possible campsite and a jeep trail and erosion were noted as impacts. The site record notes that "Excavation may be necessary to discern the value of the terrace as a site."

Table 6.8 Faunal Recovery, AU 1, 41CV95.

	Element				
Vertebrates	Indeterminate	Vertebra	left	right	Total
Mammalia (lg/vlg)	1	0	0	0	1
Mammalia (med/lg)	13	4	0	0	17
Vertebrata	4	0	0	0	4
Total	**18**	**4**	**0**	**0**	**22**
Bivalves					
Amblema plicata	0	0	17	23	40
Amblema sp.	0	0	1	4	5
Ambleminae	0	0	64	47	111
Lampsilinae	0	0	3	7	11
Megalonais nervosa	0	0	0	1	1
Quadrula apiculata	0	0	1	0	1
Quadrula sp.	0	0	1	1	2
Toxolasma sp.	0	0	3	0	3
Toxolasma texasensis	0	0	2	2	4
Tritigonia verrucosa	0	0	1	1	2
Unionacea	0	0	2	5	7
Total	**0**	**0**	**95**	**91**	**187**

Figure 6.12 Overview of Site 41CV97, Looking East.

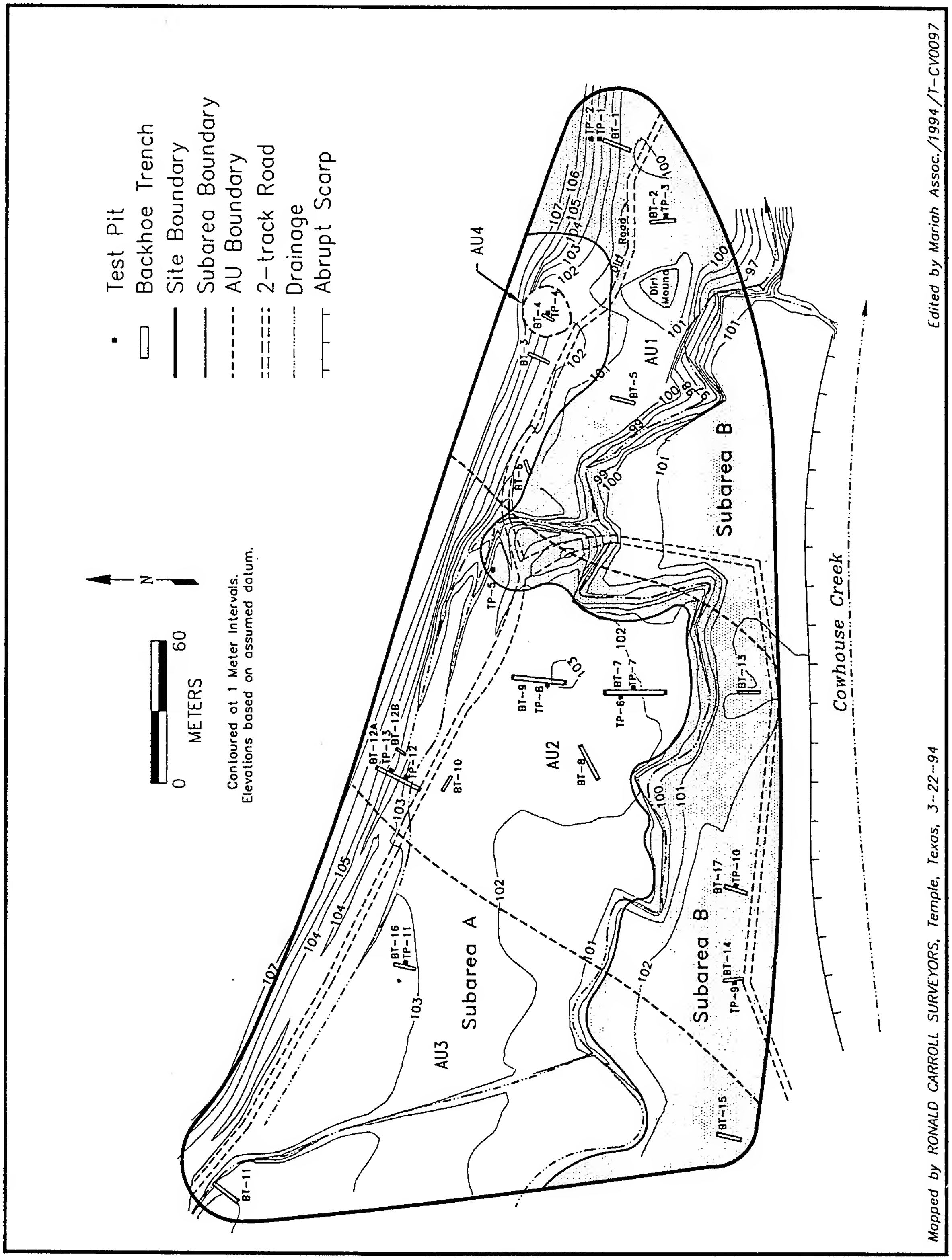

Figure 6.13 Site Map of 41CV97.

On 9 April 1981, Bruce and Chris Nightengale again recorded the site. The site setting was described as a Cowhouse Creek terrace and the toe of a southwest-facing slope, with a road and drainages bisecting the site. Artifacts observed included cores, bifaces, scrapers, burned rocks, mussel shell, and a collected Ellis point. Some material was observed 20 cmbs in an exposure. Vandalism was apparent, particularly in the southeast portion of the site. Overall, erosion, military activity, and vandalism was judged to have disturbed 50% of the site.

Moore and Strychalski monitored the site 6 January 1986. Lithics, shell, and burned rocks were noted in disturbed areas. In their opinion, the site was not as large as previously recorded and the vandal pits, possibly of military origin, were not related to the site. Nonetheless, it was believed that a large portion of the site was undisturbed and buried.

On 16 January 1992, Quigg, Lintz, Oglesby, Frederick, and Abbott revisited and reevaluated the site based on archeological and geomorphological observations. The site was divided into Subarea A (T_{1A}) and Subarea B (T_{1B}). Subarea A lies between the base of the colluvial slope and the unnamed tributary. Burned rocks, mussel shell, and lithics were noted in Subarea A, particularly in two areas where burned rock middens (Fs 1 and 2) were present. Feature 1 was observed in an erosional cut at the north-central portion of the subarea. It measured about 4 x 10 m, and cultural material was observed between 40 and 100 cmbs. A Scallorn point was collected from the surface of this feature. Feature 2, a midden or possible low mound, was located near the base of the colluvial slope and west of a minor south-flowing tributary. The feature was disturbed by military activity and bulldozing of brush. Overall, Subarea A was impacted by maneuvers, road erosion, clearing, probable plowing, an irrigation canal, and berm construction. Even though the upper portion of the deposit was judged to be possibly disturbed, the potential for in situ, deeper components was considered excellent. Shovel testing was recommended for Subarea A. No artifacts were observed on the surface of Subarea B but were thought to be possibly buried at greater depths. Accordingly, while shovel testing was not recommended for Subarea B, deeper trenching was considered warranted.

On 20 March 1992, a crew excavated 26 shovel tests in Subarea A. Twenty of these tests (77%) were positive, with cultural material recovered from 0 to 100 cmbs. Over 1,500 artifacts, including burned rocks, lithics, shell, and bone, were found, but two tests, one in each midden feature, accounted for 56% of all items recovered. Based on testing results, Subarea A was demonstrated to contain abundant cultural deposits. However, the archeological potential of both subareas remained uncertain and the site was recommended for avoidance or for formal testing if avoidance was not possible. Twelve to 14 backhoe trenches and 10 to 16 m^2 of manually excavated test pits were recommended for formal eligibility testing (Trierweiler 1994:A701-A706).

6.2.1.3 New Work

Seventeen backhoe trenches (BTs 1 through 17) and 13 manually excavated 1 x 1 m test pits (TPs 1 through 13) were dug. Thirteen trenches (BTs 1 through 12 and 16) and eleven test pits (TPs 1-8 and TPs 11, 12, and 13) were excavated in Subarea A, and four trenches (BTs 3 through 15 and BT 17) and two test pits (TPs 9 and 10) were placed in Subarea B (Table 6.9). Several backhoe trenches were intentionally placed adjacent to or outside of the previously defined site boundaries. Features were removed as cultural units whenever possible, however, some were excavated in 10 cm arbitrary levels. Recovered cultural materials are summarized in Table 6.10. On the basis of internal stratigraphy, the site was subdivided into three AU s which correspond roughly to the three alluvial fills observed on site. A fourth AU was defined to encompass investigations of the extant surficial middens.

6.2.2 Results

A wide range of alluvial deposits were uncovered by the trenches, including the Ford, West Range and Fort Hood alluvia of Nordt (1992). These three fills occur in roughly diagonal bands which become progressively younger toward the east. The boundaries between each fill trends roughly northeast to southwest (Figure 6.13). Test pits were excavated in each of the different depositional zones. Two pits were excavated specifically to explore the content of the burned rock midden deposits in Fs 1 and 2 (AU 4), while the remainder were typically located to examine features detected in the backhoe trench walls (AU s 1 through 3).

6.2.2.1 Excavations in Ford Fill and Adjacent Colluvial Deposits

At the eastern end of the site, a late Holocene fill, interpreted as the Ford alluvium of Nordt (1992), lies inset into a narrow remnant of an older fill which is preserved immediately adjacent to the colluvial slope forming the northern site boundary. The same late Holocene fill was observed in four other trenches in the eastern end of the site (BTs 2, 3, 5, and 6). This fill generally possessed loamy textured, relatively dark colored (10YR hue, moderate to low value and low chroma) alluvium within which a variety of soil profiles were described (e.g., Ap-AC-C; Ap-A-Bk-C, Ap-A-Bk-BC-C). Most of the profiles were weakly expressed and suggestive of a short period of weathering.

Test pits 1 through 3 were excavated next to the trenches in AU 1. Trench 4 was excavated specifically to explore the stratigraphy of F 2, a burned rock midden, and is discussed below in section 6.2.2.4.

Trench 1 was placed at the northeastern edge of the site and excavated to a depth of 4.1 m. The trench (Figure 6.14) exposed the boundary between the Ford fill, the older of which is tentatively identified as the Fort Hood alluvium. A complex

Table 6.9 List of Treatment Units, 41CV97.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	13	0.7	410
1	BT 2	9	0.7	350
1	BT 3	8	0.7	210
1	BT 5	11	0.7	320
1	BT 6	6.5	0.7	275
1	TP 1	1.0	1.0	150
1	TP 2	1.0	1.0	130
1	TP 3	1.0	1.0	460
2	BT 7	23	0.7	290
2	BT 8	10	0.7	200
2	BT 9	15.5	0.7	380
2	BT 10	6.3	0.7	310
2	BT 12A	20	0.7	230
2	BT 12B	5.5	0.7	170
2	BT 13	10	0.7	300
2	BT 14	7	0.7	320
2	BT 17	9	0.7	400
2	TP 6	1.0	1.0	250
2	TP 7	1.0	1.0	200
2	TP 8	1.0	1.0	150
2	TP 9	1.0	1.0	330
2	TP 10	1.0	1.0	350
2	TP 12	1.0	1.0	120
2	TP 13	1.0	1.0	100
3	BT 11	10	0.7	280
3	BT 15	9	0.7	330
3	BT 16	8	0.7	290
3	TP 11	1.0	1.0	120
4	BT 4	5	0.7	220
4	TP 4	1.0	1.0	250
4	TP 5	1.0	1.0	200

archeological feature had been constructed upon the tread of the older fill and subsequently buried by colluvium. The boundary between the two alluvial fills was present in the middle portion of

Table 6.10 Artifact Recovery by Test Pit, 41CV97.

	TEST PIT 1					TEST PIT 2					TEST PIT 3				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	4	0	0(0)	0	0	0	0	1(1)					
2	0	0	5	0	0(0)	0	0	1	0	2(1)					
3	1	2	3	0	0(0)	0	1	2	0	3(2)					
4	0	0	19	0	16(3)	0	1	0	0	11(3)			not screened		
5	3	4	27	0	0(0)	0	0	1	0	8(2)					
6	1	7	11	0	11(1)	0	0	0	0	5(2)					
7	2	3	21	2	14(1)	1	0	0	0	4(1)					
8	.3	1	13	0	23(2)	1	0	1	0	6(2)					
9	14	4	16	0	60(6.5)	0	0	0	0	10(3)					
10	27	3	22	4	34(2.5)	0	0	1	1	15(3)	0	0	0	0	0(0)
11	13	2	18	1	48(6)	3	0	7	0	12(3)	0	0	0	0	0(0)
12	117	4	31	1	140(29)	1	0	0	0	5(1)	0	0	0	0	0(0)
13	36	4	11	0	96(31)	0	0	4	0	0(0)	0	3	0	0	0(0)
14	56	3	5	0	11(4.5)						0	0	0	0	0(0)
15	6	0	4	2	2(0.5)						0	0	0	0	0(0)
16											0	0	0	0	0(0)
17											0	0	0	0	0(0)
18											0	0	0	0	0(0)
19											0	22	28	1	0(0)
20											0	0	2	0	0(0)
21											0	4	3	0	1(0.1)
22											0	35	65	1	4(1.5)
23											0	11	4	0	0(0)
24											1	15	228	3	1(1)
25											0	1	0	0	0(0)
26											0	2	2	0	2(0.3)
27											0	1	0	0	2(0.3)
28											0	3	0	0	0(0)
29											0	0	0	0	0(0)
30											0	2	0	0	0(0)
31											0	4	0	0	1(0.3)
32											0	1	0	0	0(0)
33											0	1	1	0	7(2)
34											0	0	0	0	0(0)
35											0	0	0	0	0(0)
36											0	0	0	0	0(0)
37											0	0	0	0	0(0)
38											0	0	0	0	0(0)
39											0	3	0	0	0(0)
40											0	1	4	0	0(0)
41											0	9	1	0	0(0)
42											0	46	0	0	0(0)
43											0	1	0	0	0(0)
44											0	0	0	0	0(0)
45											0	0	0	0	0(0)
46											0	0	0	0	0(0)
TOTAL	279	37	210	10	455(87)	6	2	17	1	82(24)	1	165	338	5	11(3.5) 0

	TEST PIT 4					TEST PIT 5					TEST PIT 6					TEST PIT 7				
LEVEL	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	1	26	124	4	75(13)	0	0	3	0	11(1.5)	0	0	15	1	12(2)	0	0	4	0	7(1)
2	1	26	144	8	48(7)	0	4	7	1	8(1)	0	6	95	1	5(1.5)	0	1	8	0	12(2)
3	0	57	155	1	30(3)	0	3	12	1	42(10.3)	2	13	12	0	41(7.7)	0	2	4	1	23(3)
4	0	36	0	1	30(3)	0	6	3	0	32(4.8)	1	25	18	1	36(3)	0	0	1	0	4(1)
5	0	37	103	6	55(8.5)	0	11	1	0	12(1.3)	0	24	14	2	107(23.8)	0	1	0	0	4(1)
6	1	67	67	6	70(6.5)	0	1	0	0	6(0.5)	0	19	11	3	13(2.5)	0	0	4	0	3(1)
7	1	69	178	10	40(9)	0	0	0	0	2(0.3)	0	12	11	1	7(1)	1	1	4	0	2(1)
8	1	54	100	7	75(23)	0	0	0	0	2(0.3)	0	0	21	1	9(1.4)	0	0	2	0	8(2)
9	0	14	37	3	90(18)	0	0	0	0	0(0)	0	7	12	0	3(0.5)	2	0	0	0	17(3)
10	1	27	56	3	70(22)	0	0	0	0	0(0)	0	0	28	1	6(0.5)	0	0	0	0	5(1)
11	0	2	10	0	30(4)	0	0	0	0	0(0)	0	12	27	1	13(3)	0	2	3	0	5(1)
12	5	5	25	1	40(9)	0	0	0	0	0(0)	2	15	35	1	36(6.5)	1	3	22	0	6(1)
13	42	11	14	3	85(11)	0	0	0	0	0(0)	18	37	125	5	28(3.5)	2	1	34	0	15(4)
14	57	2	17	0	213(95)	0	0	0	0	1(0.3)	13	39	138	9	21(2.5)	10	18	118	2	35(5.5)
15	7	1	7	1	189(80.5)	0	0	0	0	0(0)	1	19	120	2	21(2.5)	18	3	57	0	5(0.5)
16	21	0	1	2	189(87)	0	0	0	0	0(0)	0	3	8	2	4(0.5)	0	0	1	0	0(0)
17	3	1	6	0	67(28)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
18	0	0	3	0	36(8)	0	0	0	0	0(0)	0	1	0	1	1(0.3)	0	0	0	0	0(0)
19	3	0	6	0	110(27)	0	0	0	0	0(0)	0	0	4	0	5(0.8)	0	17	0	0	0(0)
20	3	6	4	1	317(31)	0	0	0	0	0(0)	3	1	7	0	17(1.5)	0	0	0	0	0(0)
21	1	0	8	0	218(59)						1	0	5	1	4(0.5)					
22	6	0	5	0	200(59.5)						0	0	0	0	0(0)					
23	4	1	3	0	100(23)						0	0	0	0	3(0.3)					
24	4	5	1	0	2(0.5)						0	0	0	0	1(0.2)					
25	1	0	1	1	1(0.2)						0	0	0	0	0(0)					
TOTAL	163	447	1075	58	2380(635.7)	0	25	26	2	116(20.3)	41	233	706	33	382(66)	34	49	262	3	151(28)

Table 6.10 (Concluded.)

	TEST PIT 8					TEST PIT 9					TEST PIT 10					TEST PIT 11					TEST PIT 12					TEST PIT 13				
LEVEL	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	12	3	11(0.5)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)						0	0	0	0	0(0)
2	0	2	46	0	25(2)	0	1	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)						0	0	2	0	5(0.5)
3	0	8	55	3	38(4)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)			not screened			0	0	0	0	3(0.3)
4	0	4	39	1	86(17.5)	0	0	0	0	0(0)	0	0	0	0	1(0.1)	0	0	0	0	0(0)						0	0	1	0	0(0)
5	0	6	30	0	26(3)	0	0	1	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	2	18	1	1(3)	0	0	1	0	4(0.8)
6	1	8	23	0	18(0.5)	0	0	1	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	4	58	1	4(23)	0	0	0	0	6(1)
7	0	0	21	0	27(1)	0	0	1	0	0(0)	0	21	0	0	1(0.3)	0	0	0	0	0(0)	1	2	21	1	75(14)	0	0	0	0	4(1)
8	0	7	43	2	148(15)	0	0	2	0	3(0.5)	0	0	7	0	2(1)	0	0	0	0	2(0.3)	0	1	5	0	13(2.5)	16	0	0	0	50(22)
9	0	1	11	1	0(0)	0	0	1	0	6(1)	0	9	0	0	4(1)	0	0	0	0	0(0)	1	1	6	0	0(0)	1	5	0	0	25(12)
10	1	0	3	0	7(0.5)	0	0	0	0	0(0)	1	24	5	0	3(0.5)	0	0	0	0	14(4)	3	0	1	0	14(3)	0	0	0	0	10(3)
11	0	0	4	0	2(0.5)	0	0	0	0	3(0.5)	0	25	19	1	12(1)	0	0	0	0	0(0)	3	0	5	0	0(0)					
12	0	0	5	0	1(0.1)	0	0	0	0	0(0)	1	22	30	3	16(1.2)	0	0	0	0	0(0)	0	0	3	0	0(0)					
13	1	0	0	0	0(0)	0	0	0	0	2(0.5)	0	1	10	0	6(0.5)															
14	0	0	0	0	0(0)	0	0	0	0	0(0)	0	6	4	0	2(0.2)															
15	0	0	0	0	0(0)	0	1	2	0	1(0.5)	0	5	2	1	1(0.2)															
16						0	0	0	1	0(0)	0	17	0	1	2(1)															
17						0	0	0	0	1(0.1)	0	2	0	0	2(0.2)															
18						0	0	0	0	0(0)	0	3	2	0	2(0.5)															
19						0	2	1	0	0(0)	0	0	0	0	2(0.1)															
20						0	10	1	0	1(0.1)	0	1	1	0	1(0.1)															
21						0	7	2	0	3(0.2)	0	1	0	0	0(0)															
22						1	5	1	0	5(0.5)	0	2	1	0	2(0.1)															
23						0	23	1	0	6(0.5)	0	3	0	0	2(0.1)															
24						0	1	5	0	8(0.5)	0	2	0	0	2(0.5)															
25						0	3	3	0	8(0.5)	0	3	0	0	1(0.2)															
26						0	10	0	0	14(0.5)	0	4	10	2	5(1)															
27						0	0	0	0	1(0.3)	0	13	2	1	2(0.5)															
28						0	0	1	0	0(0)	0	15	0	0	0(0)															
29						0	27	29	3	4(0.1)	0	6	0	0	2(0.1)															
30						0	39	90	3	10(0.5)	0	3	4	0	6(1)															
31						0	17	68	1	20(1.5)	1	27	22	3	35(4)															
32						0	5	1	1	2(0.2)	0	12	4	0	5(1)															
33						0	0	0	0	0(0)	0	19	0	0	0(0)															
34											0	0	0	0	0(0)															
35											0	0	0	0	0(0)															
36																														
37																														
38																														
39																														
40																														
41																														
42																														
43																														
44																														
45																														
46																														
TOTAL	3	36	292	10	389(44.6)	1	151	211	9	98(8.5)	3	246	123	12	119(16.4)	0	0	0	0	16(4.3)	8	10	117	3	107(45.5)	17	5	4	0	107(40.6)

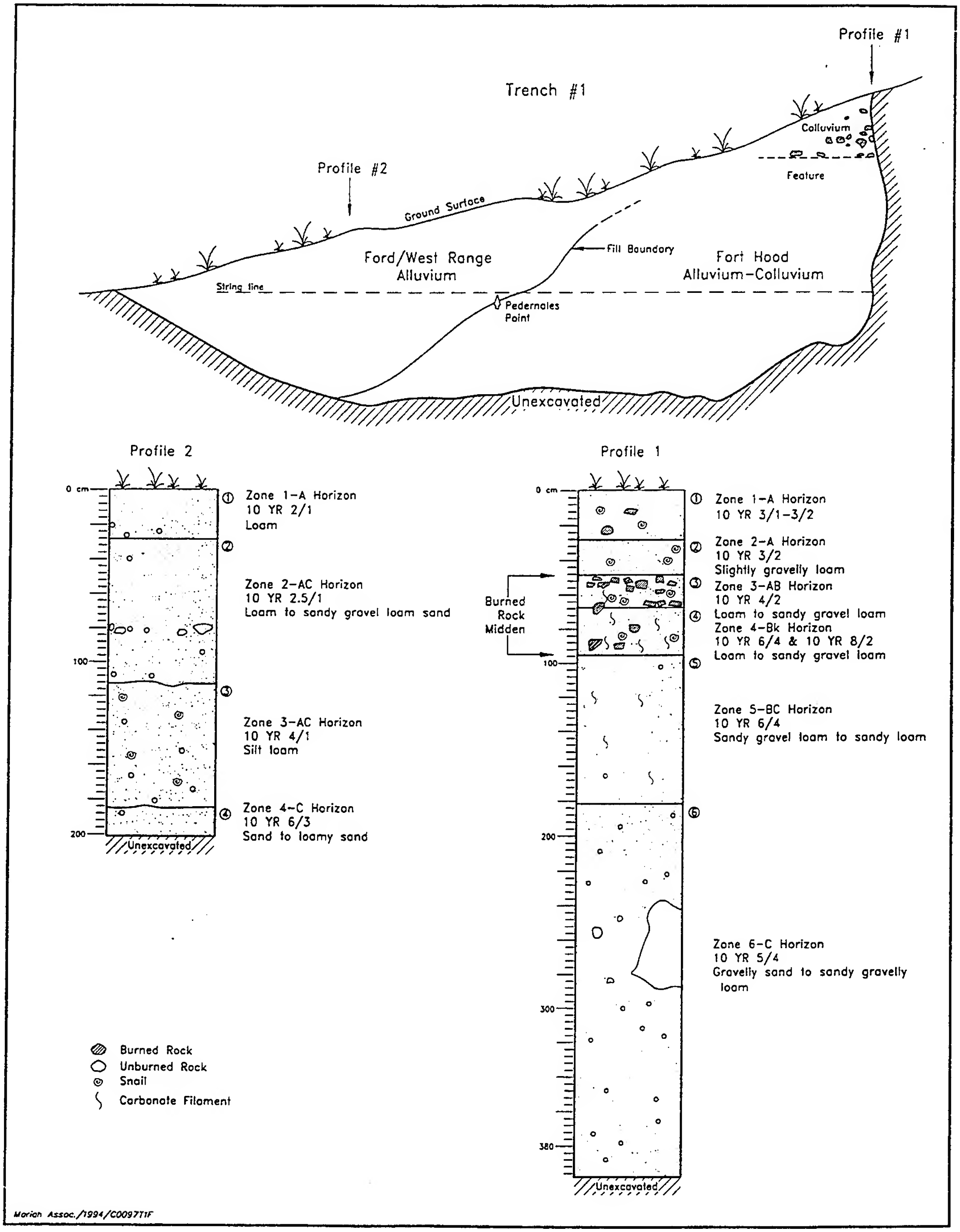

Figure 6.14 Schematic Profile and Measured Sections from BT 1, 41CV97.

the trench and a Pedernales point was collected from this fill boundary, suggesting that the younger fill was actively aggrading during or after the Middle Archaic. An AMS radiocarbon age of 1150 ± 50 BP (Beta b-74068) was obtained from a small fleck of charcoal resting on this surface. This is consistent with the field assessment of the younger surface fill as Ford alluvium, but it implies that there also may be some West Range alluvium underlying the Ford alluvium.

Test pit 1, excavated to 150 cmbs, was placed about 75 cm upslope from the northern edge of BT 1, and did not encounter the Ford fill. Rather, the unit exposed primarily colluvial and mixed alluvial/colluvial deposits resting on the older Fort Hood fill, and contained cultural material in each excavated level (Table 6.10). A light artifact density (fewer than 12 items per level) was recovered from Levels 1 through 3, with the artifact counts increasing (to 35 to 45 items per level) from 30 to 80 cmbs. Cultural material (burned rocks, mussel shell, bone, and lithics) was scattered across the unit and interspersed with a moderate to heavy density of unburned rock and gravel, suggesting colluvial/alluvial deposition.

Feature 3, a burned rock midden that appeared to represent a series of stacked, stratigraphically separate features, was encountered in TP 1 at 82 cmbs. Initially, it consisted of a concentration of burned rock in the southwest quadrant of the test pit and along the south wall. The concentration extended from 82 to 90 cmbs, yielding a total of 60 fist-sized and smaller burned rocks (6.5 kg total). No patterning was apparent; however, the concentration was thickest in the southwest corner of the unit. Associated artifacts included several flakes, mussel shells, a few bone fragments, and carbonized wood (identified as live oak). A small pocket of pea-sized gravels was also noted 89 to 100 cmbs in the northwest corner of the unit. Lithics, including a Castroville and a Bulverde point, mussel shell, bone, and small burned rocks, were recovered from Level 10, particularly from 90 to 92 cmbs. A moderate artifact density was recovered from 100 to 110 cmbs.

Feature 3A (a burned rock "pavement") was encountered from 110 to 115 cmbs. The feature consisted of one flat, horizontal layer of densely packed burned rocks (n=136, 28 kg, with an average size of 10 cm) extended across the entire unit. Numerous flakes and mussel shells, a long bone fragment, and charcoal were recovered from the feature fill. An AMS radiocarbon analysis of charcoal from F 3A yielded a corrected age of 3090 ± 100 BP (Beta b-75262), indicating that the feature is of late Middle Archaic or early Late Archaic age and is contained in colluvium that accumulated during the lower West Range alluvial period. From 115 to 120 cmbs, the typical artifact array, including an untyped dart point, was recovered, however, only five small burned rocks were found.

Feature 3B, another burned rock "pavement," was exposed at 122 cmbs and continued to 133 cmbs. The feature consisted of one to two densely compacted layers of burned rocks (n=96, 31 kg) across the entire unit. Again, the rocks averaged 10 cm in size and lay relatively flat. Flakes, bone fragments, mussel shell, and charcoal were found in association. Although a moderate amount of pea-sized gravel was noted in Levels 9 through 14, all features appear intact based on construction and confinement. Below F 3B, from 135 to 150 cmbs, artifact frequencies decreased substantially.

Test pit 2 was placed about 2 m upslope from TP 1 to help better define extent of F 3, and revealed a profile more strongly dominated by coarse colluvium. Excavation was terminated at 130 cmbs, when large rocks and boulders covered about two-thirds of the unit. Cultural material and a moderate to very heavy rock density was found in each level of TP 2 (Table 6.10). Although few to several burned rocks were found in each level from 0 to 80 cmbs, debitage and ecofacts were relatively sparse. A notable increase in burned rocks and flakes occurred from 80 to 110 cmbs. This increase of artifacts may correspond with the features encountered in TP 1, however, integrity and context are dubious because of the heavy amount of colluvial deposition.

Although not designated as such in the field, examination of data from TP 1 and TP 2 suggests that the material from these two test pits represents a relatively sparse burned rock midden, with Fs 3, 3A, and 3B representing discrete internal components. However, integrity of the deposit in TP 2 is suspect since the burned rocks in this test pit were highly diffuse (as opposed to the dense, compact feature morphology from 82 to 135 cmbs in TP 1) and intermixed with a moderate to heavy amount of medium-sized unburned rocks and gravels (alluvial/colluvial deposition).

Trench 2 was placed about 30 m southwest of BT 1 and excavated to a depth of 3.5 mbs. In profile, the upper 90 cm of fill was disturbed, and included compacted road construction debris. Below this, the fill exhibited marked stratification and is interpreted as the Ford fill. Ash lenses and cultural debris was observed in the wall of the trench between approximately 170 and 250 cmbs. Test pit 3 (Figure 6.15) was offset from the east wall of BT 2, where the ash was visible, and excavated to 460 cmbs. The deposits from 0 to 90 cmbs were clearly disturbed and removed as overburden. From 90 to 180 cmbs, only one bone fragment was found. At 180 to 190 cmbs, several lithics and bone fragments, including part of an animal mandible, were recovered. Since these artifacts were recovered from a distinct loamy stratigraphic unit that was underlain by a sandy, flood drape, this cultural material appears to represent the first buried occupation in this unit. Levels 20 and 21 contained a light density of artifacts (less than 10 per level).

A noticeable increase in artifact counts occurred at 210 to 220 cmbs in TP 3. Numerous flakes and bone fragments and a few burned rocks were found in this level. A shallow, seemingly ovate, basin-shaped hearth (F 4) was encountered at 226 cmbs and extended to 230 cmbs (Figure 6.16). The feature was located in the west-central portion of the unit and was bisected by BT 2 (see Figure 6.15). Maximum dimensions of the remaining portion of the feature were 61 x 25 cm. The feature matrix consisted of ash and charcoal (some of which was identified as elm), with a very thin oxidation rind defining the base of the hearth. Some flakes and bone fragments were found in association. In addition, a small ash pocket (about 10 x 15 cm), possibly representing a clean-out pile, was noted in the northwestern corner of the unit. A radiocarbon age of 690 ± 70 BP (Beta b-75154) was obtained from F 4, indicating that (1) the feature is of Late Prehistoric age, and (2) the alluvial fill is probably equivalent to Nordt's (1992) Ford fill.

Feature 5, another basin-shaped hearth, was encountered 235 to 242 cmbs (see Figure 6.14). While the feature was mainly confined to the northeastern quadrant of the unit, it did extend beyond the test pit boundary to the east. Maximum dimensions were 66 x 64 cm; however, the feature was irregularly shaped. A 1 to 2 cm layer of mottled matrix (ash, oxidized soil, and charcoal) capped the feature, with charcoal-stained soil comprising the remaining fill. Charcoal from the flotation sample taken from the feature was identified as live oak, suggesting that that taxon was at least one of the fuels consumed in the feature. One medium-sized burned rock was noted within the feature fill, and a high density of cultural material, including lithics, bone, and mussel shell umbos, were found in association. Through the remainder of Level 25 and continuing through Level 28, fewer than six cultural items were found per level. This may represent a very ephemeral occupation or downward movement of cultural material from the overlying occupation through bioturbation. No cultural material was found from 280 to 300 cmbs. Another series of levels containing some cultural items was noted from 300 to 330 cmbs, and appears to constitute another buried occupation. Levels 34 through 38 were culturally sterile. Several small bone fragments and a few flakes were found from 390 to 430 cmbs, suggesting the presence of a possible third stratified occupation. No cultural material was present in Levels 44 through 46.

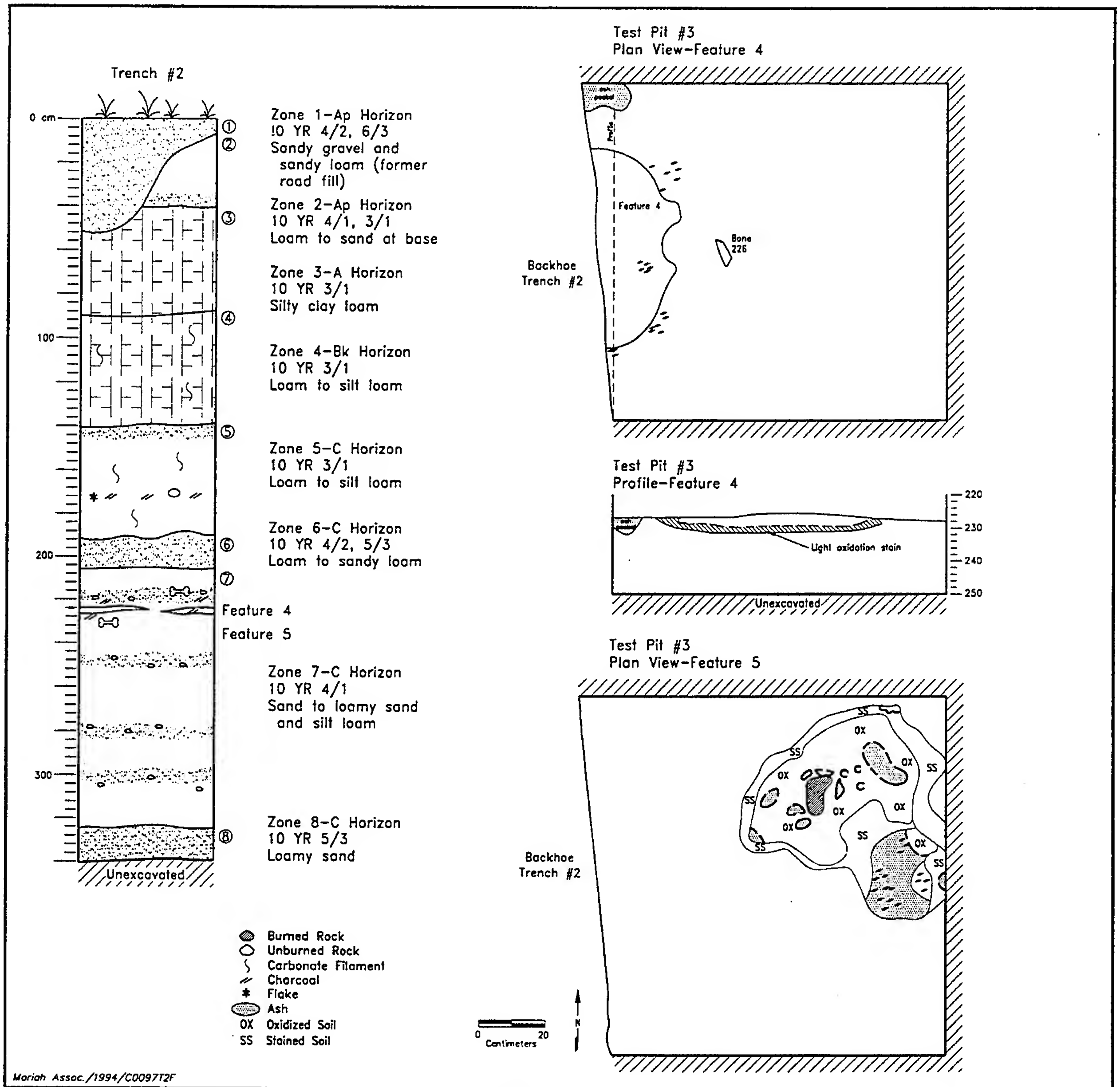

Figure 6.15 Measured Section of BT 5 (compressed to show lateral variability), Plan and Profile of F 4, and Plan of F 5, TP 3, 41CV97.

The recovered projectile points from this AU cover the entire Archaic period; however, the Castroville and Bulverde came from the same provenience (Table 6.11). A multiple platform core and 14 chipped stone tools were also recovered from this unit (Table 6.12). Of note are the presence of an adze, a burin, and a wedge, all wood-working tools, in this assemblage. There appears to be no patterning to the chert material preference as the types present include a variety of named and indeterminate sources. However, 26% of the cherts are from the distant Southeast Range, while 33% are Cowhouse varieties, and 33% are North Fort chert varieties.

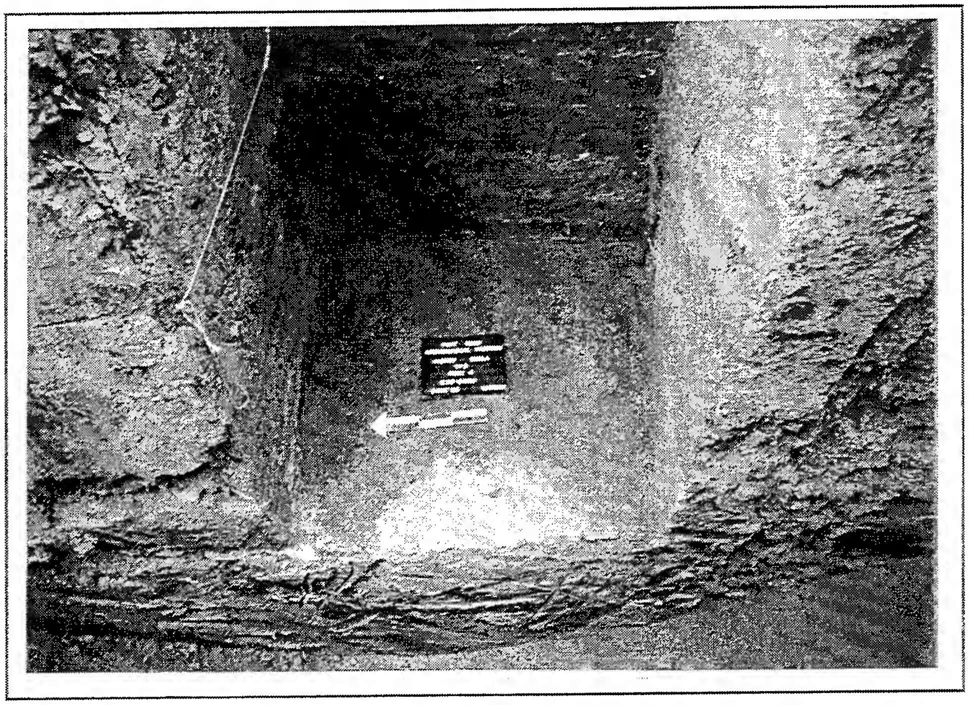

Figure 6.16 Feature 4, 41CV97, Looking East.

One untyped bone tool was recovered (TP 1, Level 5) and has been identified to the Mammalian Class.

Thirteen identified chert types and nine indeterminate chert categories were included in the debitage sample from AU 1 (Table 6.13). Roughly 16.4% of the total debitage assemblage from AU 1 was identified. As a result of this low identification ratio, the binomial test yielded a greater than expected result for the indeterminates and less than expected results for each of the identified types. When the indeterminates were excluded, Fort Hood Yellow and Table Rock Flat occurred in greater than expected frequency, Fossiliforous Pale Blue, Cowhouse Mottled with Flecks, and Cowhouse Mottled/Banded occured in less than expected frequencies, and the remainder of recognized types occurred in the expected range (Table 6.14).

The suite of identified flakes are associated with three of the four chert provinces identified on the base. The majority of the sample is associated with alluvial cherts obtained from the Cowhouse province, with additional material representing the North Fort and Southeast Range provinces. If the Heiner Lake Translucent Brown material is

Table 6.11 Projectile Points, AU 1, 41CV97.

	Lithic Material			
Point Type	06-HL Tan	22-C Mott/Flecks	Indet Lt Gray	Total
Bulverde	0	0	1	1
Castroville	0	1	0	1
Other Dart	1	0	0	1
Pedernales	1	0	0	1
Total	**2**	**1**	**1**	**4**

Table 6.12 Cores and Nonprojectile Point Lithic Tools, AU 1, 41CV97.

	Core Type	Tool Type									
Lithic Material	multiple platform	adze	burin	end scraper	middle stage biface	other tool	preform	uniface	utilized flake	wedge	Total
02-C White	0	0	0	0	0	1	0	0	0	0	1
06-HL Tan	0	0	0	0	0	0	1	0	0	0	1
08-FH Yellow	0	0	0	0	1	1	0	0	0	0	2
09-HL Tr Brown	0	0	0	0	2	0	0	0	0	0	2
15-Gry/Brn/Grn	0	0	0	0	1	0	0	0	0	0	1
17-Owl Crk Black	0	0	0	0	0	0	0	1	1	0	2
19-C Dr Gray	1	0	0	0	0	0	0	0	0	0	1
22-C Mott/Flecks	0	0	0	1	0	0	0	0	0	0	1
Indet Dk Brown	0	0	1	0	0	0	1	0	0	0	2
Indet Lt Brown	0	1	0	0	0	0	0	0	0	0	1
Indet Lt Gray	0	0	0	0	0	0	0	0	0	1	1
Total	**1**	**1**	**1**	**1**	**4**	**2**	**2**	**1**	**1**	**1**	**15**

assumed to have originated in the Southeast Range province, the relative percentages are 35% Cowhouse province, 40% North Fort province, and 24% Southeast Range. If the Heiner Lake Translucent Brown material is instead assumed to be alluvial chert, the relative percentages of Cowhouse and Southeast Range become 45.7% and 13.8%, respectively. Indeterminates are dominated by light brown and light gray flakes, which probably reflect material obtained from a variety of sources.

The overall assemblage is strongly skewed toward smaller flakes, with 69% of the total falling in size grades less than 1.2 cm. As usual, the identified fraction shows the opposite tendency (67% larger than 1.2 cm), reflecting the higher degree of "identifiability" of the larger flakes. Roughly 25% of the total are cortical flakes, of which 39% are obviously stream abraded, 12% are not abraded, and 49% are indeterminate (Table 6.15). The data suggests that the full range of lithic reduction activity is represented, but much of this activity may have focused on relatively small, alluvial cobbles that precluded the production of many large flakes.

A variety of faunal material was recovered from AU 1 (Table 6.16). One of the most striking components of the assemblage is a considerable quantity of sheep and goat remains (approximately 100 elements). This material was recovered from the upper 20 cm of BT 6, and appears to represent victims of a historic flood. None of the bones was cut or charred, and only one was spirally fractured. The position of BT 6 suggests that these animals are buried in material splaying out from the ditch that parallels the base of the slope at the rear of the terrace. In any case, they represent animals contained in a historic mantle on the terrace surface. Other remains include a variety of unidentifiable mammal bones ranging in size from

microtine rodents to bison-sized animals, deer and unidentifiable artiodactyls, small birds, opossum, and a variety of turtles. Bivalves representing a minimum of three species were recovered, including one species (*Megalonais nervosa*) unique to very deep (2 m+) pools.

6.2.2.2 Excavations in West Range Fill

In the middle portion of the site, an older fill was tentatively identified as the West Range alluvium of Nordt (1992). This fill was present in at least six trenches (BTs 7, 8, 9, 10, 14, 17, and probably 13 and BTs 12 and 12B) and in general is slightly lighter in color (10YR 4/2 to 5/4) than the Ford alluvium. The sediments exposed in these trenches also exhibited a more advanced degree of soil development, principally expressed as a thick calcic horizon. Soils described within this fill exhibited a variety of profiles (e.g. Ap-Bk-BC, Ap-Bk, Ap-AB-Bk). Archeological materials are common throughout this fill, and occasionally appear to be concentrated in the upper portion of the deposit. Nine backhoe trenches (BTs 7 through 10, 12, 12A, 13, 14, and 17) were excavated in the center portion of the site in deposits that were dominantly composed of West Range alluvium and are included in AU 2. Seven test pits (TPs 6 through 10 and TPs 12 through 13) were excavated next to trenches in this area.

Trench 7 was excavated in the south-central portion of the site to a depth of 2.9 mbs. Cultural material, including at least three burned rock concentrations or possible hearths, were visible in the trench profile (Figure 6.17). Test pit 6, excavated to 250 cmbs, and TP 7, excavated to 200 cmbs, were offset from the west and east walls of BT 7, respectively.

Within TP 6, cultural material, including lithics, bone, mussel shell, and burned rocks, was recovered from most of the levels excavated (Table 6.10). Within the upper 20 cm, several flakes and burned rocks, and three bone fragments were found. A dramatic increase in burned rocks, bone fragments, and mussel shell occurred from 20 to 45 cm; however, the majority of burned rocks were quite small and dispersed, suggesting the material may be reworked or disrupted by plowing. At 45 to 63 cmbs, a rock-lined hearth (F 7) was encountered, primarily in the southwest quadrant of the unit (see Figure 6.17). The feature measured 80 x 70 cm and appeared to extend west and south beyond the unit's boundaries. A total of 76 rocks, weighing 18.4 kg, was removed from the fill. Most rocks were tabular, averaging 6 to 10 cm in

Table 6.13 Debitage Recovery by Size and Material Type, AU 1, 41CV97.

	Size (cm)							
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	Total
Identified Types								
02-C White	0	0	0	0	1	0	0	1
06-HL Tan	0	0	1	4	3	2	0	10
07-Foss Pale Brow	0	0	0	1	1	0	0	2
08-FH Yellow	0	0	3	5	5	3	0	16
09-HL Tr Brown	0	0	0	7	3	0	0	10
14-FH Gray	0	0	0	2	1	1	0	4
15-Gry/Brn/Grn	0	1	2	5	0	0	0	8
17-Owl Crk Black	0	3	5	0	2	0	0	10
18-C Mottled	0	0	0	0	0	3	1	4
19-C Dr Gray	0	0	0	2	0	1	0	3
22-C Mott/Flecks	0	0	0	1	1	0	0	2
23-C Mott/Banded	0	0	0	0	0	2	0	2
28-Table Rock Flat	0	0	16	5	1	0	0	22
Subtotal	*0*	*4*	*27*	*32*	*18*	*12*	*1*	*94*
Unidentified Types								
Indet Black	10	1	4	2	0	0	0	17
Indet Dk Brown	4	18	14	12	7	0	0	55
Indet Dk Gray	1	0	10	0	0	2	0	13
Indet Lt Brown	60	85	73	28	30	10	0	286
Indet Lt Gray	0	50	4	6	1	1	0	62
Indet Misc.	0	8	5	3	2	0	0	18
Indet Mottled	0	0	4	1	2	0	0	7
Indet Trans	1	7	6	4	1	0	0	19
Indet White	0	0	2	0	0	0	0	2
Subtotal	*76*	*169*	*122*	*56*	*43*	*13*	*0*	*479*
Total	**76**	**173**	**149**	**88**	**61**	**25**	**1**	**573**

Table 6.14 Binomial Statistic Results, AU 1, 41CV97.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maxiumum	Results	Expected Minimum	Expected Maxiumum	Results
02-C White	10	29	53	less	3	13	expected
06-HL Tan	6	29	53	less	3	13	expected
07-Foss Pale Brown	2	29	53	less	3	13	less
08-FH Yellow	16	29	53	less	3	13	more
09-HL Tr Brown	10	29	53	less	3	13	expected
14-FH Gray	4	29	53	less	3	13	expected
15-Gry/Brn/Grn	8	29	53	less	3	13	expected
17-Owl Crk Black	10	29	53	less	3	13	expected
18-C Mottled	4	29	53	less	3	13	expected
19-C Dr Gray	3	29	53	less	3	13	expected
22-C Mott/Flecks	2	29	53	less	3	13	less
23-C Mott/Banded	2	29	53	less	3	13	less
28-Table Rock Flat	22	29	53	less	3	13	more
Total Indet	479	29	53	more	na	na	na

size, with some cracked in situ. In cross-section, two rock layers were visible. The lower rocks were slanted whereas the upper layer rested relatively flat, suggesting a very shallow basin shape. Several flakes and bone fragments (burned and unburned) were found within the feature fill. A drill was found along the outer, southeast edge of the feature and several bone fragments, flakes, and very small, angular burned rocks (n=31, 5.4 kg.) were recovered from the matrix surrounding the feature. Several of the bone fragments, including three long bone fragments, one vertebral fragment, and one phalange, were later identified as belonging to a human juvenile. Upon identification, all of these human remains were immediately returned to Fort Hood DEH to await repatriation.

Below F 7, from 63 to 110 cmbs, burned rock frequencies were relatively low; however, several flakes were found. In addition to these artifacts, bone was found in all but one of these levels which included the tooth of a pronghorn in Level 6; a Marcos point was found at 68 cmbs. A substantial increase in artifact frequencies occurred from 110 to 140 cmbs. Within these levels, burned rock counts peaked at 110 to 120 cmbs, then slowly declined to 140 cmbs, while flake counts increased sharply from 110 cmbs to a peak at 130 to 140 cmbs. Several bone fragments and mussel shells were also recovered from these levels, with a Marcos dart point found at 128 cmbs, and Godley a dart point found at 137 cmbs. High artifact counts continued from 140 to 150 cmbs, with F 10 (two hearths) exposed from 143 to 147 cmbs. The feature consisted of two distinct, ovate, oxidized areas of soil (see Figure 6.17). Maximum dimensions of the westernmost stain were 41 x 35 cm, whereas the stain in the southeast quadrant measured 36 x 24 cm. The base of each stain was flat in cross-section, and both were extensively disturbed by *krotavina*. A few burned rocks, heavily charred bone fragments, and heat-treated debitage were found within the oxidized soil. A similar artifact array, with higher frequencies, was recovered outside the areas of oxidation. A radiocarbon age of 2890 ± 60 BP (Beta b-75152) was obtained from charcoal collected from just above the hearths in Level 15.

From 150 to 160 cmbs, artifact frequencies drastically declined and Level 17 was sterile.

Table 6.15 Debitage Cortex Characteristics by Material Type, AU 1, 41CV97.

	All Cortex		Partial Cortex					
Lithic Material	Abraded	Indeterminate	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
02-C White	0	0	0	0	0	1	0	1
06-HL Tan	0	0	2	1	0	7	0	10
07-Foss Pale Brown	0	0	1	0	0	1	0	2
08-FH Yellow	0	0	1	1	4	10	0	16
09-HL Tr Brown	0	0	2	0	0	8	0	10
14-FH Gray	0	0	0	0	1	3	0	4
15-Gry/Brn/Grn	0	0	1	0	0	7	0	8
17-Owl Crk Black	0	0	0	0	0	10	0	10
18-C Mottled	0	0	3	0	0	1	0	4
19-C Dr Gray	0	0	1	0	2	0	0	3
22-C Mott/Flecks	0	0	0	1	1	0	0	2
23-C Mott/Banded	0	0	1	0	0	1	0	2
28-Table Rock Flat	0	0	1	0	4	17	0	22
Subtotal	*0*	*0*	*13*	*3*	*12*	*66*	*0*	*94*
Indet Black	0	0	0	1	1	15	0	17
Indet Dk Brown	0	0	1	0	4	50	0	54
Indet Dk Gray	0	0	2	0	0	11	0	13
Indet Lt Brown	4	1	28	12	35	204	2	286
Indet Lt Gray	0	0	5	1	2	54	0	62
Indet Misc.	0	0	2	0	12	4	0	18
Indet Mottled	0	0	0	0	2	2	3	7
Indet Trans	0	0	0	0	2	17	0	19
Indet White	0	0	0	0	0	2	0	2
Subtotal	*4*	*1*	*38*	*14*	*58*	*359*	*5*	*479*
Total	**4**	**1**	**51**	**17**	**70**	**425**	**5**	**573**

From 170 to 240 cmbs artifact frequencies were low at 170 to 190 cmbs peaking at 190 to 200 cmbs, where scattered burned rocks (n=17, 1.5 kg) were encountered across the western half of the unit. Frequencies steadily declined from 200 to 210 cmbs, and rapidly decreased from 210 to 250 cmbs.

The pattern of cultural materials in the upper 150 cm of TP 7 is broadly similar to that observed in TP 6 (Table 6.10). In TP 7, a total of 61 artifacts was recovered 0 to 30 cmbs. Forty-five (69%) of these items were small-to medium-sized burned rocks, about half of which came from Level 3. Levels 4 through 7 contained a light amount of cultural material. An increase in burned rock counts was noted from 70 to 90 cmbs, with several burned rocks averaging 5 cm in size, along with a couple of flakes and a mussel shell, found therein. Once again, low artifact frequencies were encountered from 90 to 110 cmbs. A noticeable increase in cultural material, particularly lithics,

Table 6.16 Faunal Recovery, AU 1, 41CV97.

	Element																																
Vertebrates	Accessory carpal	Astagalus	Axis	Calcaneus	Cranium	Distal phalange	Femur	Fused 2&3rd carpal	Fused 3&4th carpals	Fused 3&4th metatar	Humerus	Indeterminate	Long bone	Mandible	Metapodial	Middle phalange	Neural	Pelvis	Permanent tooth	Podial	Proximal Phalange	Radial carpal	Radius	Ribb	Scapula	Shell	Tibia	Tibiotarsus	Ulna	Vertebra	left	right	Total
Artiodactyla	0	1	0	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	6
Aves (large)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Aves (small)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Carnivora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
cf. capra hircus	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
cf. Didelphis virgin	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	7
cf. Ovis sp.	0	2	0	6	0	1	0	0	0	4	1	0	0	0	0	10	0	0	0	0	12	0	1	0	0	0	0	0	1	0	0	0	38
Emydidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mammalia	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
Mammalia (lg/vlg)	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	2	0	0	13
Mammalia (med/lg)	0	0	1	0	0	0	1	0	0	0	0	186	5	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	0	0	201
Mammalia (micro/sm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Mammalia (very lg)	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	7
Ovis/Capra	2	0	0	1	0	3	10	1	0	6	2	0	0	6	2	0	0	1	15	1	2	2	1	0	2	0	2	0	0	0	0	0	59
Testudinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Vertebrata	0	0	0	0	0	0	0	0	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
Total	2	3	1	8	1	5	11	1	1	10	4	254	9	6	3	10	1	1	22	1	14	2	4	11	2	1	2	1	2	6	0	0	399
Bivalves																																	
Amblema plicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	23	47
Ambleminae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	26	49
Cyrtonaias sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Lampsilinae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	23	39
Lampsilis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Megalonais nervosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Quadrula houstonensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Quadrula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Toxolasma texasensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	6
Tritigonia verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	5	11
Unionacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	6
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77	87	164

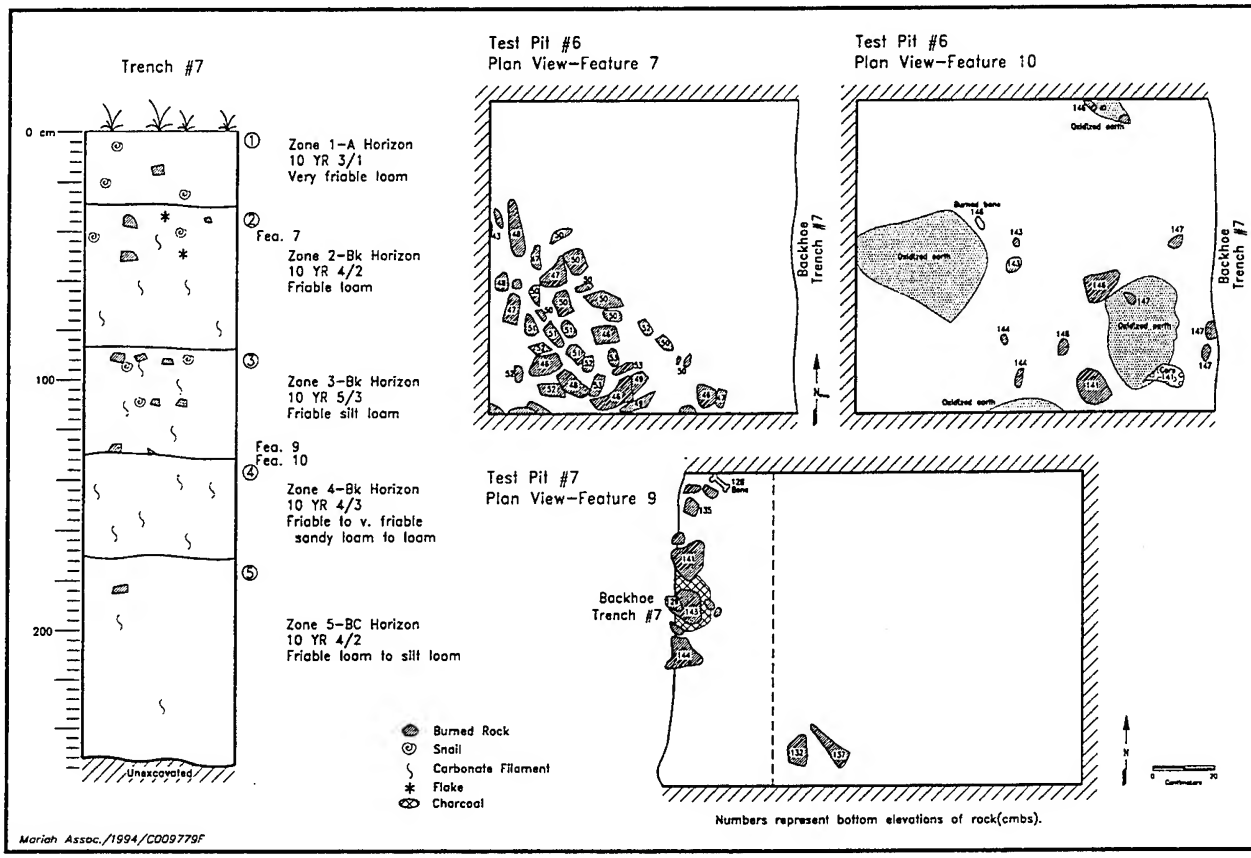

Figure 6.17 Measured Section of BT 7, and Plan Views of Fs 7 and 9, TP 6, F 10, and TP 7, 41CV97.

occurred from 110 to 150 cmbs. Artifact frequencies within these levels were relatively low at 110 cmbs, peaked at 130 to 140 cmbs, and declined at 140 to 150 cmbs. Feature 9 (a rock-lined hearth) was encountered from 128 to 147 cmbs (see Figure 6.17). The feature was bisected during trenching and remaining dimensions were 60 x 20 cm. The hearth consisted of a single layer of flat, horizontal, tabular burned rocks. The maximum rock depth was 143 cmbs, with a charcoal lens encountered directly beneath the rock at 143 and continuing to 147 cmbs. A radiocarbon age of 2900 ± 70 BP (Beta b-75151) was obtained from charcoal recovered from the feature matrix. Thirteen rocks (3.5 kg), averaging 5 to 15 cm in size, were recovered from the remaining portion of the feature, and a moderate amount of cultural material (lithics, shell umbos, and bone) was recovered from the feature matrix. A similar artifact array, including a Castroville dart point, was noted outside the feature. Below F 9, a couple of flakes were found from 150 to 160 cmbs and the remainder of the levels from 160 to 200 cmbs were culturally sterile.

Trench 9 was excavated at approximately the center of the site to a depth of 3.8 mbs. Burned rock concentrations were exposed in the west wall profile. Test pit 8 was offset from the west wall of BT 9, over the exposed burned rock, and excavated to 150 cmbs. In TP 8, high frequencies of artifacts were found in the upper levels, while relatively low frequencies were found in the lower levels (Table 6.10). From 0 to 80 cmbs, burned rock and debitage frequencies were relatively high throughout, although two noticeable peaks occurred

at 20 to 40 cmbs and at 70 to 80 cmbs, respectively. Burned rock concentrations (Fs 6 and 8) were located within each of these peaks. The first burned rock concentration (F 6) was encountered at 22 cmbs and extended to 38 cmbs (Figure 6.18). The feature measured 45 x 42 cm and was confined to the southeast quadrant of the unit. The burned rocks (n=30, 10 kg) averaged 10 cm in size and were three layers thick. Several flakes and snail shells and a few bone fragments were recovered from the feature fill, while recovery from the matrix surrounding the feature included numerous flakes, several small burned rocks (4 kg total), and a few bone fragments. One of these bone fragments was later identified as a human cervical vertebra and was immediately returned to Fort Hood DEH, for repatriation.

The second burned rock concentration (F 8) covered the entire test pit, but was more concentrated in the eastern half of the unit. The feature was encountered 68 to 76 cmbs and consisted of a single burned rock layer that exhibited no patterning. A total of 148 rocks weighing 15 kg and averaging 10 cm in size was recovered from the feature. A few bone fragments, deer teeth, and numerous flakes were found in association. A Pedernales point, several flakes, and a bone fragment were found in Level 9, below the feature. From 90 to 130 cmbs, very light amounts of cultural material were recovered per level, with artifact frequency decreasing with depth. Levels 14 and 15 were culturally sterile.

Trench 14 was placed at the southwest side of the site, near the western boundary of the West Range fill and excavated to 3.2 mbs. A burned rock concentration, at least three areas of intensely burned earth, and a scatter of lithics and bone were noted in profile (Figure 6.19).

Test pit 9 was offset from the west wall of BT 14, above the burned rock concentration and one of the burned earth areas, and excavated to 330 cmbs. The upper 70 cm of TP 9 was virtually devoid of cultural material (Table 6.10). From 70 to 190 cmbs, levels containing a few burned rocks and/or flakes were interspersed with culturally sterile levels. Although somewhat ephemeral, this may represent a series of stratified occupations. Beginning with Level 20 and continuing to Level 24, burned rock counts steadily increased with depth. Several bone fragments and a few flakes were also recovered from these levels.

Feature 13 (a partially rock-lined hearth) was exposed in TP 9 from 245 to 252 cmbs (see Figure 6.19). Maximum feature dimensions were 45 x 55 cm, with the hearth mainly confined to the northeast quadrant of the unit. This feature consisted of a circular, 5 to 6 cm thick charcoal stain containing burned soil. Twenty-eight scattered burned rocks lay within and adjacent to the limits of the charcoal stain (Figure 6.20). The rocks ranged in size from 5 to 15 cm, with a total weight of 3 kg. In profile, the hearth had a relatively flat base, and no artifacts were noted within the feature matrix. However, several burned rocks and bone fragments, charcoal, and a few flakes were associated with the feature. Below the base of F 13, several bone fragments, including a deer tooth, were recovered from 252 to 260 cmbs. Levels 27 and 28 were virtually devoid of cultural material. Artifact frequencies increased dramatically at 280 cmbs, peaked at 290 to 300 cmbs, remained high from 300 to 310 cmbs, and decreased substantially to 320 cmbs. Within these levels, a diffuse area of ash, about 25 x 12 x 3 cm in size, was noted along the west wall, and charcoal flecking was noted in the western half of the unit, from 280 to 300 cmbs. Features 16 and 17 (hearths) were exposed from 300 to 317 and 306 to 318 cmbs, respectively (see Figure 6.19). In retrospect, the ash and burned earth noted in the two previous levels (29 and 30) were probably scattered fill from these features.

Feature 16 was a basin-shaped hearth consisting of ash and oxidized soil. It covered the entire southwest quadrant of TP 9, with maximum dimensions of 75 x 60 cm. Ashy matrix capped the hearth from 300 to 308 cmbs (the thickest section), with oxidized soil encountered from 306 to 308 cmbs and continuing to 317 cmbs. Twelve

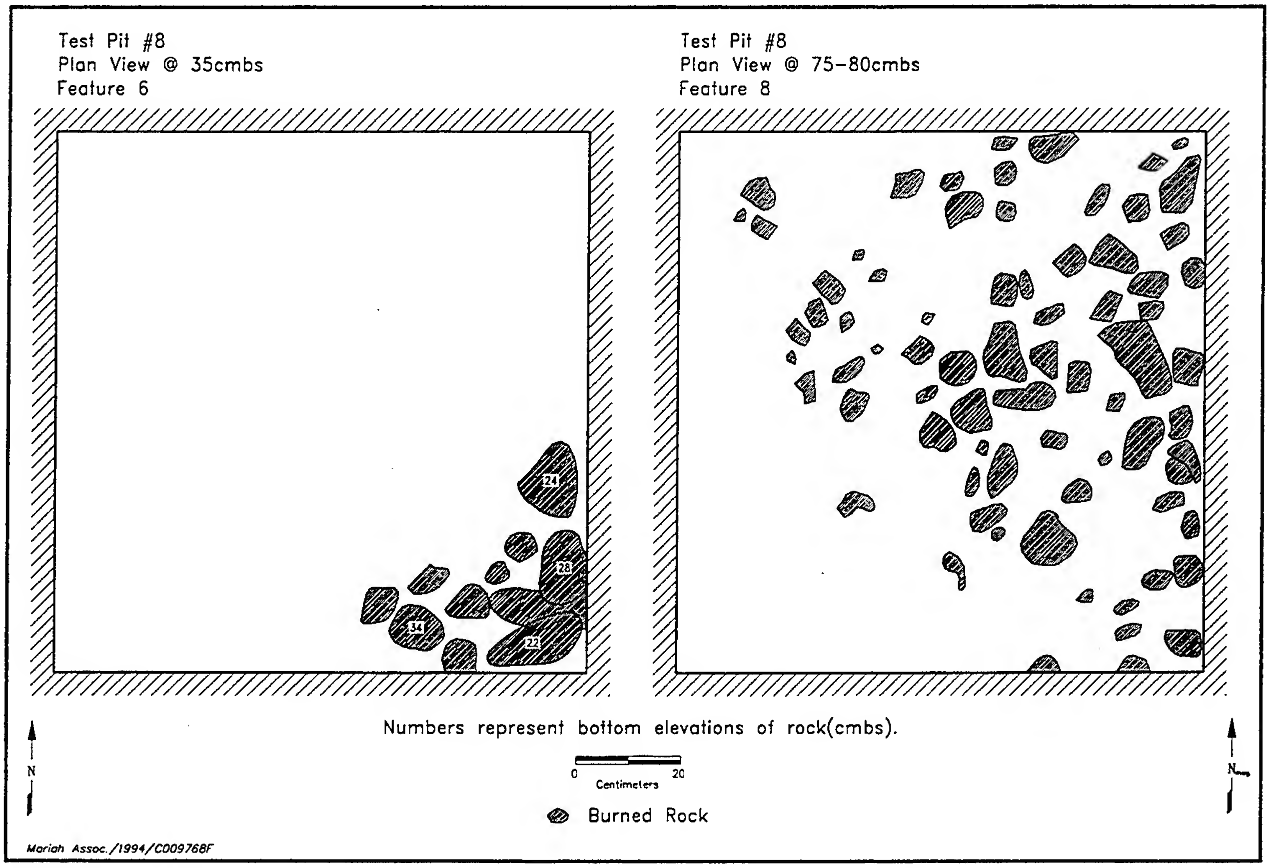

Figure 6.18 Plan View of F 6 (35 cmbs), F 8 (75-80 cmbs), and TP 8, 41CV97.

bone fragments and 21 lithics were recovered from the feature fill, and carbonized wood recovered from the matrix was identified as live oak. Large animal burrows were noted criss-crossing the feature at 306 cmbs.

Feature 17, a basin-shaped hearth, was located along the east wall of TP 9, bisected by BT 14. Maximum remaining dimensions were 55 x 25 cm. The ash fill was 5 cm thick and was underlain by an oxidized soil that formed an irregular base. Aside from small roots, this feature appeared to be undisturbed. The feature matrix contained three flakes. In Level 31, numerous flakes, several small burned rocks and bone fragments, and charcoal were recovered from the nonfeature matrix. A light amount of cultural material was associated with the features from 310 to 320 cmbs. No cultural material was found in Level 33.

Trench 17 was placed on the south-central site margin and excavated to 4 mbs. Cultural material was fairly ubiquitous in the profiles. Burned rock concentrations, an ash lens, and isolated artifacts were noted at various depths (Figure 6.21). Test pit 10 was offset from the east wall of BT 17 over several apparent features visible in the trench wall and excavated to 350 cmbs. The upper 60 cm of TP 10 was devoid of cultural material (Table 6.10). Artifact frequencies were low from 60 to 100 cmbs, peaked from 100 to 120 cmbs, and decreased rapidly to a culturally sterile level at 200 to 210 cmbs. From 210 to 250 cmbs, recovery was sparse, with a few lithic artifacts and bone fragments found in each level. Of note, at 240 cmbs, an area of burned earth was exposed in the southeast quadrant along the east wall profile. Maximum dimensions were roughly 38 x 18 cm, and in cross-section was 3 cm thick with a flat

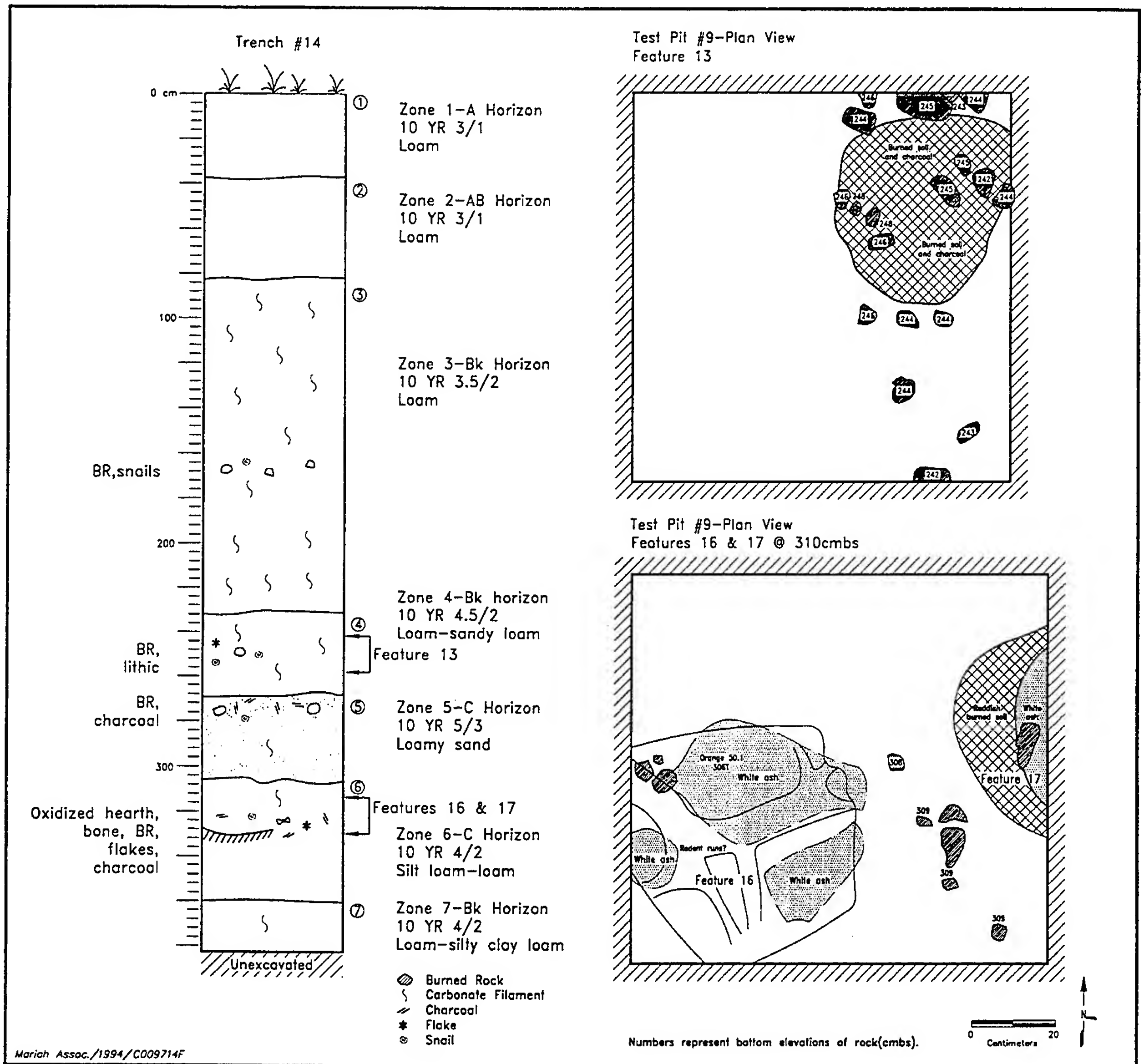

Figure 6.19 Measured Section of BT 14 and Plan Views of Fs 13, 16, and 17, and TP 9, 41CV97.

base. Based on its morphology and preponderance of burned roots noted in previous levels, this feature did not appear to be a cultural phenomenon and was not assigned a feature number.

Artifact frequencies increased dramatically from 250 to 280 cmbs, with a burned rock concentration (F 14) encountered from 258 to 272 cmbs and a hearth (F 15) exposed from 263 to 282 cmbs (see Figure 6.21). F 14 was a small, discrete burned rock cluster exposed in the southwest quadrant of the unit. It measured 27 x 20 cm and consisted of eight angular burned rocks, two layers thick, with the majority of rocks noted in the upper layer. The rocks weighed 1.5 kg and ranged from 3 to 7 cm in size. No artifacts were found directly within the matrix of F 14; however, bone, mussel shell fragments, and lithics, including an Ensor-like point at 259 cmbs, were found in association.

Feature 15, a rock-lined hearth, was confined to the eastern third of the test pit, but extended

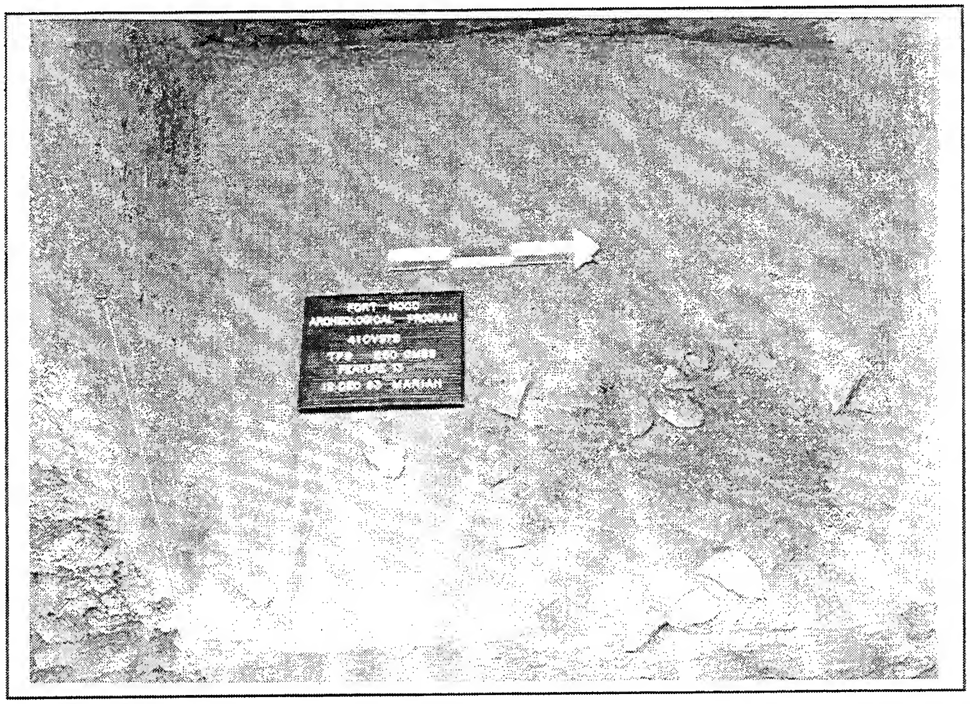

Figure 6.20 Feature 13, 41CV97, Looking West.

beyond the unit's eastern boundary. The exposed portion measured 80 x 30 cm and consisted of two layers of rock containing 54 burned rocks weighing a total of 4.5 kg. The upper layer was comprised of angular rocks less than 5 cm in size, whereas the lower layer consisted of larger (5 to 10 cm) tabular rocks. The outer edge of rocks gently sloped inward, whereas the base of the hearth was relatively flat, indicating a shallow basin shape. A small, oxidized area (5 cm in diameter), was noted near the east wall, between the first and second rock layer. An artifact array similar to that found in F 14 was found in F 15. Of note is the recovery of a Edgewood point at 264 cmbs, directly from the feature matrix. A 30 x 30 cm area of oxidized soil, 3 to 4 cm thick, was encountered 6 to 8 cm (288 to 290 cmbs) below the hearth. This oxidized area appeared to be associated with F 15. It is likely that the burned rock concentration (F 14) is a "clean out" pile of rock and ash removed from the hearth (F 15).

In addition, at 264 cmbs, an oval shaped, oxidized area, approximately 30 cm in diameter, was exposed in the northwest quadrant. This area was designated F 18. However, after cross-sectioning, this area was determined to be a natural occurrence (i.e., an in situ burned root or stump). The "feature" extended to at least 370 cmbs and contained charcoal and burned earth, which yielded a radiocarbon age of 2376 ± 63 BP (TX-8189). Although this age probably represents a burned, intrusive root, it provides a clear minimum age for material occurring below approximately 260 cm.

Artifact recovery from TP 10 diminished to a few lithic artifacts and bone fragments from 282 to 300 cmbs. Again, artifact frequencies sharply increased from 300 to 320 cmbs. A slab-lined hearth (F 19) was encountered from 305 to 315 cmbs (see Figure 6.21). The feature was bisected by BT 17, and the aforementioned "F 18" was intrusive along the eastern edge. The hearth was located in the west-central third of the unit and maximum dimensions were 60 x 30 cm. Construction consisted of a

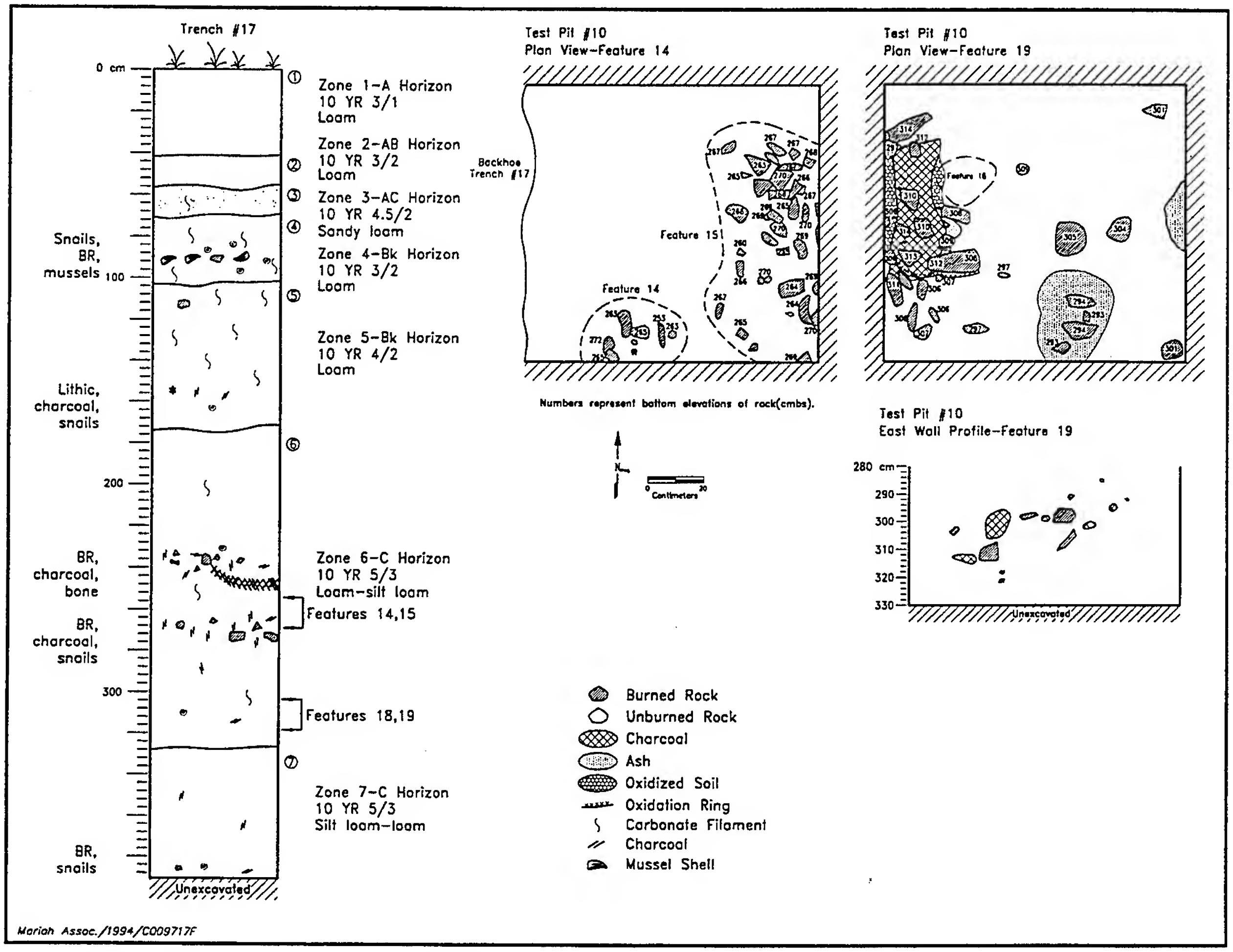

Figure 6.21 Measured Section of BT 17, Plan Views of Fs 14 and 15, and Plan and Profile of F 19, and TP 10, 41CV97.

single layer of 21 burned rocks weighing 5.5 kg. Most of the rocks were tabular slabs, 10 to 15 cm in size. The edges sloped gently inward, and the base of the pit was relatively flat, suggesting a shallow basin shape. The feature matrix contained charcoal and ash, with an oxidized rind noted along the edges of the hearth. A biface fragment and uniface were recovered from the feature fill. Several burned rocks, flakes, and bone fragments were found in association. The area immediately surrounding F 19 was noted as being heavily disturbed by *krotavina*. From 320 to 325 cmbs, several bone fragments (many burned) were found along the southwest corner of the unit. From 325 to 350 cmbs, no cultural material was recovered.

Trench 12a (2.3 m deep) and 12b (1.7 m deep) were excavated adjacent to each other at the north-central edge of the site (Figure 6.22). Trench 12a bisected an irrigation canal and berm that parallelled the colluvial slope. Trench 12b, about 7 m east of BT 12a, bisected a subtle rise located between the slope and canal. No cultural material was observed in BT 12b, but burned rock concentrations were exposed in the walls of BT 12a. Test pits 12 and 13 were offset from the east wall of BT 12a, over two separate burned rock concentrations, and excavated to 120 cmbs and 100 cmbs, respectively.

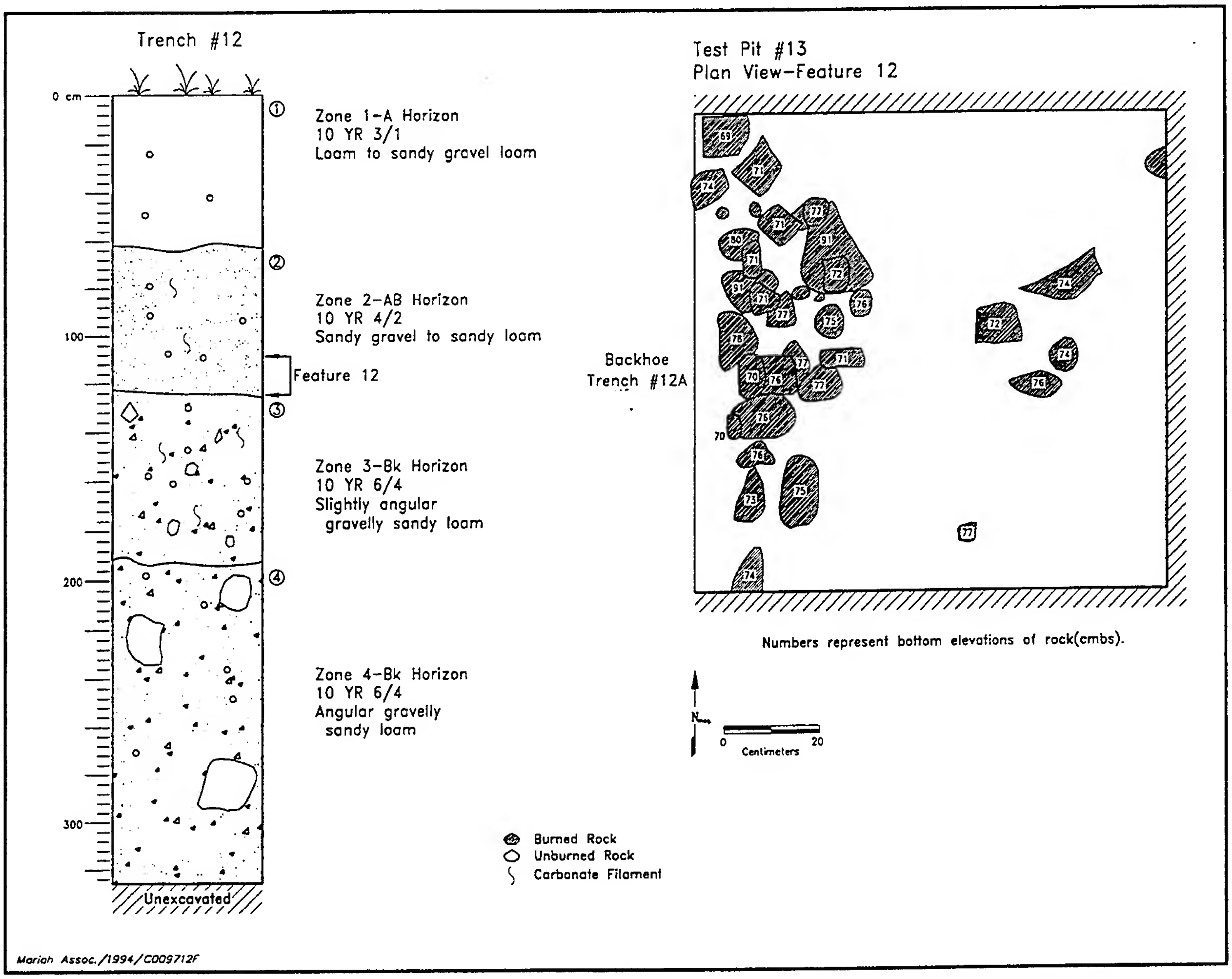

Figure 6.22 Measured Section of BT 12A and Plan of F 12 (95 cmbs), and TP 13, 41CV97.

The upper 40 cm of fill in TP 12 was disturbed spoil that now forms the berm. It and was removed as overburden. From 40 to 90 cmbs, artifact frequencies were relatively low from 40 to 50 cmbs, peaked from 50 to 70 cmbs, and dramatically decreased at 70 to 90 cmbs. In addition, an extremely high density of unburned limestone and gravels (roughly three times the number of burned rocks) was noted within these levels, suggesting substantial colluvial input. During excavation, the zone of high lithic and burned rock frequency (50 to 70 cmbs) was not formally designated a feature since integrity and context were questionable. However, these strata do coincide with F 12 in TP 13 (discussion below) and may be an extension of the occupation surface associated with that feature. Several small burned rocks were recovered from 90 to 100 cmbs, although only a few artifacts were found in association. From 100 to 120 cmbs, a few flakes and bone fragments were found.

In TP 13, cultural material was relatively sparse, and a heavy amount of unburned rock was noted in the upper 66 cm. Artifact frequencies increased markedly from 66 to 91 cmbs, where a shallow, basin-shaped hearth (F 12) was encountered. The feature was bisected by BT 12a and was confined to the western third of the unit. Maximum dimensions of the remaining part of the feature were 100 x 36 cm. The hearth was constructed of a single burned rock layer with minimal overlap

between adjacent stones. Most rocks along the perimeter gently sloped inward, with the remainder horizontally laid. Some exhibited in situ heat fracturing. Eighty to 90 relatively large, primarily tabular burned rocks weighing a total of 34 kg were recovered from the feature. No artifacts were directly recovered from the feature fill, but one bone fragment, a few shell umbos, and some burned rocks were recovered in association. A moderate amount of unburned colluvial rock was noted throughout the fill; however, the subtle basin-shaped morphology and the presence of in situ, heat-fractured rocks suggests that this is a relatively undisturbed feature. Cultural material recovered from below F 12 in Level 10 consisted of several small burned rocks (3 kg).

Eight projectile points were recovered from AU 2 including those discussed above. Half of these points are made of Heiner Lake Tan chert (Table 6.17). Only one point is made from an unknown chert source material. The assemblage consists of 66 specimens including one hammerstone, 4 cores, and 61 chipped stone tools (Table 6.18). Chert from the Southeast Range zone is 32% of the total chert types represented by these tools, only the indeterminate types have greater representation (41%).

A total of 15 identified chert types and nine indeterminate categories of chert was included in the debitage assemblage recovered from AU 2 (Table 6.19). Roughly 20% of the overall assemblage was identified. When the entire assemblage was considered, the aggregate indeterminate category occurred in greater than expected frequency, and all of the identified types occurred in less than expected frequency. When the indeterminates were excluded, Heiner Lake Tan, Fort Hood Yellow, Heiner Lake Translucent Brown, Gray/Brown/Green, and Owl Creek Black occurred in greater than expected frequencies; Fort Hood Gray occurred in expected frequency; and Cowhouse White, Anderson Mountain Gray, Fossiliferous Pale Brown, Heiner Lake Blue, Leona Park, Cowhouse Mottled, Cowhouse Dark Gray, Cowhouse Mottled/Flecked, and Cowhouse Mottled/Banded occurred in less than expected frequencies (Table 6.20). Indeterminates were dominated by light brown flakes (48% of the total assemblage), with dark brown flakes also comprising a significant component (15% of the total assemblage).

All four chert provinces are represented in the identified fraction of the assemblage, although one (West Fort), comprises less than 1% of the total. The most strongly represented province is North Fort, which is represented by five types that together comprise 55% of the total. If Heiner Lake Translucent Brown is considered as a Cowhouse province type, then the local Cowhouse province is the next most frequent source, with 24% of the total, and the Southeast Range is third with roughly 20%. However, with the exception of Heiner Lake Translucent Brown, no Cowhouse province cherts occur in expected numbers or greater. If Heiner Lake Translucent Brown is instead considered a component of the Southeast Range assemblage, then that province becomes the second most important source with 36% of the total, while the local alluvial source decreases to less than 7% of the total.

The size distribution is strongly skewed toward relatively small flakes, with 70% of the total smaller than 1.2 cm. Once again, the identified fraction shows a tendency to be larger than the overall assemblage with a mode of 1.2 to 1.8 cm. Slightly more than 13% of the assemblage is composed of cortical flakes, of which 36% are abraded alluvial cherts, 12% are unabraded, and 51% are indeterminate (Table 6.21).

A relatively large and diverse faunal assemblage was recovered from AU 2 (Table 6.22). The majority of remains are probably deer, with 35 *Odocoileus* sp. elements, 27 unidentified Artiodactyl elements, and 392 unidentified fragments from deer-sized animals dominating the assemblage. However, one tooth was recovered that indicates that at least some of this material represents pronghorn, which implies that relatively open grasslands existed in the vicinity during the

period. Other represented taxa include toad, soft shelled turtle, large bird (e.g., turkey), unidentified carnivore, jackrabbit, and, interestingly, beaver. The mussel assemblage includes a minimum of six species representing riverine environments ranging from deep clear pools to shallow, fast currents and substrates ranging from firm sandy to soft muddy bottoms. At least 104 individuals are represented, suggesting that the mussels were a significant secondary food source and that a wide range of aquatic micro-environments were exploited in their collection.

Table 6.17 Projectile Points, AU 2, 41CV97.

	Lithic Material					
Point Type	03-AM Gray	06-HL Tan	08-FH Yellow	09-HL Tr Brown	Indet Lt Gray	Total
Castroville	0	1	0	0	0	1
Edgewood	0	0	1	0	0	1
Ensor	1	0	0	0	0	1
Godley	0	1	0	0	0	1
Marcos	0	1	0	1	0	2
Other Dart	0	0	0	0	1	1
Pedernales	0	1	0	0	0	1
Total	**1**	**4**	**1**	**1**	**1**	**8**

6.2.2.3 Excavations in Fort Hood Fill

The Fort Hood alluvium was tentatively identified in three trenches (BTs 11, 15, and 16) at the west end of the site. This fill exhibited 10YR and occasionally 7.5YR hues, and in the field appeared to be slightly redder in color than the West Range. The texture of this fill was highly variable, ranging from clay in BTs 15 and 16, to loam and slightly gravelly loam in BT 11, but the most significant difference was the occurrence of small, flat calcium carbonate nodules formed between ped faces in the Bk horizon of soils formed in clayey facies. The coarser facies appeared to contain less secondary carbonate than all of the West Range alluvium exposures elsewhere on site, but retained a significantly redder color. In two of the three profiles, a younger capping alluvial deposit appeared to be present, and this fill was tentatively identified as the West Range alluvium. Descriptions of the soils formed in this alluvium included A-AB-2Bk, Ap-A-Bw-Bkss-B, and A-2Ab-2Bwb-2Cb profile sequences. Relatively little cultural material was observed within this unit, but one feature appeared to be buried near the top of this fill in BT 16.

Trench 16 was excavated in the west-central portion of the site to a depth of greater than 3 m (Figure 6.23). The trench bisected a hearth-like feature approximately 90 to 100 cmbs. Test pit 11, excavated to 120 cmbs, was offset from the east wall of BT 16 and above the rock-lined hearth (F 11). Feature 11 was encountered from 91 to 104 cmbs. It was contained in the west-central third of the unit and measured 42 x 33 cm. The hearth was constructed with a single layer of 14 subangular burned rocks (4 kg) ranging in size from 4 to 14 cm (Figure 6.24). Four rocks (28%) gently sloped down toward the hearth center, however, an obvious basin shape is difficult to ascertain. No artifacts or staining was observed within the feature fill, and only one small burned rock and eight snails were noted in the nonfeature matrix. In fact, with the exception of the burned rocks comprising F 11 and a few burned rocks found above the feature in Level 8, TP 11 contained no prehistoric cultural material.

No material suitable for radiocarbon dating was recovered from the feature. However, a series of eight *Rabdotus* snails from TP 11, Level 11 was submitted for A/I analysis. These specimens produced A/I values ranging from 0.104 to 0.408, and exhibited no strong clustering. Rather, the shells produced a series of values that equate to relatively evenly-spaced radiocarbon-equivalent ages ranging between approximately 4400 and 8700 BP, with one outlier equivalent to a radiocarbon age of approximately 18,500 BP. Two different clusters of equivalent ages overlapping at

Table 6.18 Lithic Tools, AU 2, 41CV97.

	Core Type			Tool Type															
Lithic Material	flake/blank	multiple platform	tested cobble	adze	biface	complex scraper	crushing/battering	drill	early stage biface	end scraper	Hammerstone	late stage biface	middle stage biface	other tool	preform	side scraper	uniface	utilized flake	wedge	Total
06-HL Tan	1	1	0	1	0	0	0	1	0	0	1	0	1	0	0	0	4	1	0	11
08-FH Yellow	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	3
09-HL Tr Brown	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	3	1	1	8
10-HL Blue	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
13-ER Flecked	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
14-FH Gray	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	1	4
15-Gry/Brn/Grn	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
17-Owl Crk Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
18-C Mottled	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
19-C Dr Gray	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	3
22-C Mott/Flecks	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
23-C Mott/Banded	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
27-C Novaculite	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Indet Dk Brown	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	2	1	0	6
Indet Dk Gray	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	4	0	0	6
Indet Lt Brown	0	0	1	0	0	0	0	0	1	1	0	0	0	1	2	0	4	2	0	12
Indet Lt Gray	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
Indet Misc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total	**1**	**2**	**1**	**1**	**1**	**1**	**0**	**1**	**6**	**2**	**1**	**3**	**3**	**2**	**5**	**3**	**25**	**6**	**2**	**66**

±5% of the value, each composed of only two shells, are apparent in the data. These two clusters average approximately 5050 and 8500 BP, respectively.

The younger of these two values (5050 BP) is tentatively accepted as the age of deposition, although the true age may in fact be represented by the youngest value (e.g., approximately 4400 BP). Both of these ages are broadly coincident with the waning stages of the Fort Hood fill episode (Nordt 1992). The strong spread of values is interpreted to be a result of the feature's differential heating of the surrounding matrix containing the snails rather than slow, long-term deposition or reworking of older snails, although the latter is also a possibility.

6.2.2.4 Excavations in the Burned Rock Midden

Feature 1 was first recognized and described in January 1992 as a burned rock midden visible in an erosional cut located approximately 5 m from the base of the colluvial slope. The midden exposure measured about 4 x 10 m and cultural material was buried between 40 and 100 cmbs. During formal eligibility testing, TP 5 (an isolated unit) was placed 3 to 4 m south of the erosional cut and near an irrigation canal that converged with a dirt road and small drainage in the north-central portion of the site. Portions of the midden have been damaged by the aforementioned construction and subsequent erosion of the canal, and to a lesser extent by road traffic.

Table 6.19 Debitage Recovery by Size and Material Type, AU 2, 41CV97.

	Size (cm)							
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	Total
Identified Types								
02-C White	0	0	2	1	1	1	0	5
03-AM Gray	0	0	1	0	1	0	0	2
06-HL Tan	0	2	7	18	14	6	1	48
07-Foss Pale Brown	0	0	0	6	3	1	0	10
08-FH Yellow	0	11	15	16	7	0	0	49
09-HL Tr Brown	0	14	19	11	10	0	0	54
10-HL Blue	0	3	0	3	2	0	0	8
14-FH Gray	0	1	6	5	3	1	0	16
15-Gry/Brn/Grn	0	3	22	6	7	2	0	40
16-Leona Park	0	0	0	0	0	1	0	1
17-Owl Crk Black	7	38	11	16	4	1	0	77
18-C Mottled	0	0	0	0	2	0	0	2
19-C Dr Gray	0	1	3	4	3	1	0	12
22-C Mott/Flecks	0	0	0	0	0	1	0	1
23-C Mott/Banded	0	0	1	5	2	2	0	10
Subtotal	*7*	*73*	*87*	*91*	*59*	*17*	*1*	*335*
Unidentified Types								
Indet Black	2	6	6	1	0	0	0	15
Indet Dk Brown	15	103	67	49	9	6	0	249
Indet Dk Gray	1	44	18	22	2	3	0	90
Indet Lt Brown	51	321	248	130	53	20	1	824
Indet Lt Gray	1	13	19	16	3	0	0	52
Indet Misc.	10	49	32	14	1	1	0	107
Indet Mottled	0	3	1	6	2	2	0	14
Indet Trans	1	4	3	2	1	0	0	11
Indet White	1	6	3	4	0	0	0	14
Subtotal	*82*	*549*	*397*	*244*	*71*	*32*	*1*	*1376*
Total	**89**	**622**	**484**	**335**	**130**	**49**	**2**	**1711**

Test pit 5 was excavated to 200 cmbs. Lithics, bone fragments, mussel shell, and burned rocks were recovered from the upper 20 cm, however, pieces of rubber were also found in Level 2, indicating disturbance. The burned rock midden, F 1, was buried from 20 to 52 cmbs. A substantial increase in burned rock, bone, and lithic counts coincided with the upper two levels (20 to 40 cmbs) of the feature, with the lower two levels containing far fewer artifacts. Approximately 80% of the burned rocks were 4 to 9 cm in size, with about five rocks larger than 10 cm, and the remainder smaller than 4 cm. Most were tabular, with no apparent patterning. Across the test pit, the feature dipped south to north with a difference in elevation of 8 to 9 cm and did extend beyond the unit on all sides. A few burned rocks were found below the midden from 52 to 80 cmbs, and

Table 6.20 Binomial Statistic Results, AU 2, 41CV97.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	5	87	127	less	13	31	less
03-AM Gray	2	87	127	less	13	31	less
06-HL Tan	48	87	127	less	13	31	more
07-Foss Pale Brown	10	87	127	less	13	31	less
08-FH Yellow	49	87	127	less	13	31	more
09-HL Tr Brown	54	87	127	less	13	31	more
10-HL Blue	8	87	127	less	13	31	less
14-FH Gray	16	87	127	less	13	31	expected
15-Gry/Brn/Grn	40	87	127	less	13	31	more
16-Leona Park	1	87	127	less	13	31	less
17-Owl Crk Black	77	87	127	less	13	31	more
18-C Mottled	2	87	127	less	13	31	less
19-C Dr Gray	12	87	127	less	13	31	less
22-C Mott/Flecks	1	87	127	less	13	31	less
23-C Mott/Banded	10	87	127	less	13	31	less
Total Indet	1376	87	127	more	na	na	na

an area of oxidized soil roughly 10 cm in diameter was noted from 65 to 71 cmbs in the northwest quadrant of the unit. This stain appeared to be a natural phenomenon given that burned roots were evident in cross-section. With the exception of a burned rock recovered from 130 to 140 cmbs, Levels 9 through 20 were culturally sterile.

Feature 2, a burned rock midden, was also first noted in January 1992. It was located on the northeastern portion of the site just west of a minor tributary, near the base of the colluvial slope, and approximately 100 m east of F 1. The midden was described as disturbed by vandalism, military activity, and push piles. No feature dimensions were given. Backhoe trench 3, excavated to 2.1 mbs, was placed near F 2; however, no evidence of the midden was exposed in this trench. Backhoe trench 4 (Figure 6.25) was located approximately 10 m east of BT 3 and excavated to 2.2 mbs. Feature 2 was clearly visible in profile, with a substantial portion of the midden haven been obviously vandalized based on the presence of historic material and extremely loose fill.

Test pit 4 was offset from the east wall of BT 4 and excavated to 250 cmbs. The upper 230 cm of the test pit contained midden deposits (F 2) and internal features (Fs 2A, 2B, and 2C). Extremely high frequencies of artifacts were found in each level of the midden. The upper 40 cm of the feature were obviously disturbed by an active ant nest and vandalism. Numerous lithics, including two untyped arrow points, a Scallorn point, bone fragments, a few mussel shells, a bone bead, and a heavy density of burned rocks were found in these disturbed levels. In addition, charcoal identified as live oak was recovered from Level 3.

At 38 cmbs, F 2A, an ash lens, was encountered. The matrix of F 2A consisted of a thick, laterally confined lens of whitish to light gray and ash-rich silt and was very distinct from the surrounding F 2 fill, which consisted of gray-brown silty loam. Maximum dimensions of the ash lens were 75 x 73 cm, with the feature mostly confined to the northwest quadrant of the unit. Based on the outline in TP 4, the feature appeared roughly oval or circular in shape. The ash lens extended to 60

Table 6.21 Debitage Cortex Characteristics by Material Type, AU 2, 41CV97.

	All Cortex			Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
02-C White	0	0	0	0	2	1	2	0	5
03-AM Gray	0	0	0	0	1	0	1	0	2
06-HL Tan	0	0	0	9	1	1	37	0	48
07-Foss Pale Brown	0	0	0	1	0	4	5	0	10
08-FH Yellow	0	0	0	1	0	4	43	1	49
09-HL Tr Brown	0	0	0	4	0	1	49	0	54
10-HL Blue	0	0	0	0	0	0	8	0	8
14-FH Gray	0	0	0	1	0	1	14	0	16
15-Gry/Brn/Grn	0	0	0	3	1	5	31	0	40
16-Leona Park	0	0	0	0	0	0	1	0	1
17-Owl Crk Black	0	0	0	2	0	1	74	0	77
18-C Mottled	0	0	0	0	0	0	2	0	2
19-C Dr Gray	0	0	0	0	0	2	10	0	12
22-C Mott/Flecks	0	0	0	1	0	0	0	0	1
23-C Mott/Banded	1	0	0	1	0	5	3	0	10
Subtotal	*1*	*0*	*0*	*23*	*5*	*25*	*280*	*1*	*335*
Indet Black	0	0	0	1	0	1	10	3	15
Indet Dk Brown	0	0	0	7	0	15	225	2	249
Indet Dk Gray	0	0	0	9	0	6	75	0	90
Indet Lt Brown	3	1	1	33	13	54	706	13	824
Indet Lt Gray	0	0	0	2	3	0	47	0	52
Indet Misc.	0	0	0	1	7	9	84	6	107
Indet Mottled	0	0	0	1	0	3	7	3	14
Indet Trans	0	0	0	0	0	0	11	0	11
Indet White	0	0	0	0	0	0	14	0	14
Subtotal	*3*	*1*	*1*	*54*	*23*	*88*	*1179*	*27*	*1376*
Total	**4**	**1**	**1**	**77**	**28**	**113**	**1459**	**28**	**1711**

cmbs. Rather than contracting with depth, as would be expected if the material was deposited in a basin, the feature flared slightly and had a relatively flat bottom, suggesting that it probably represents a dump pile of ash and matrix. Numerous flakes and burned rocks, several burned and unburned bone fragments, a few mussel shells, a light amount of charcoal, and two Scallorn points were recovered from the ash fill. Of the total burned rock (n=75, 9.5 kg) recovered from F 2A, the majority were less than 5 cm in size. Feature 2 comprised the remainder of the unit from 40 to 60 cmbs, with angular burned rocks (average 5 cm in size), mussel shell, charcoal, bone fragments, and two untyped arrow point fragments recovered. At 50 cmbs, an extremely loose strip (95 x 12 cm) of matrix was present along the east wall. This extended to 90 cmbs and was judged to be the

Table 6.22 Faunal Recovery, AU 2, 41CV97.

	Element																						
Vertebrates	Antler	Calcaneus	Distal phalange	Femur	Fourth Carpal	Fused 3&4th metata	Indeterminate	Long bone	Metapodial	Middle phalange	Pelvis	Permanent tooth	Proximal Phalange	Rib	Carapace	Thoracic vertebra	Tibia	Tibiotarsus	Tooth	Ulna	left	right	Total
Antilocapra americana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Artiodactyla	0	1	0	2	1	4	3	0	3	1	1	0	2	0	0	0	1	0	4	0	0	0	23
Bufo sp.	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Carnivora	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Castor canadensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Lepuis californicus	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Mammalia	0	0	0	0	0	0	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39
Mammalia (med/lg)	0	0	0	0	0	0	341	2	1	0	0	0	0	4	0	0	1	0	0	0	0	0	349
Mammalia (sm/med)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	2
Odocoileus sp.	20	0	1	0	0	0	0	0	0	1	0	8	0	0	0	0	0	0	5	0	0	0	35
Testudinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Trionyx sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Vertebrata	0	0	0	0	0	0	272	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	272
Total	**20**	**1**	**1**	**2**	**1**	**4**	**655**	**2**	**4**	**2**	**3**	**10**	**2**	**4**	**3**	**1**	**2**	**0**	**10**	**1**	**0**	**0**	**728**
Bivalves																							
Amblema plicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	4	11
Ambleminae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	10	24
Lampsilinae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	5	11
Lampsilis hydiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	4
Lampsilis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Quadrula houstonensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Toxolasma sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Toxolasma texasensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Tritigonia verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Unionacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**39**	**24**	**63**

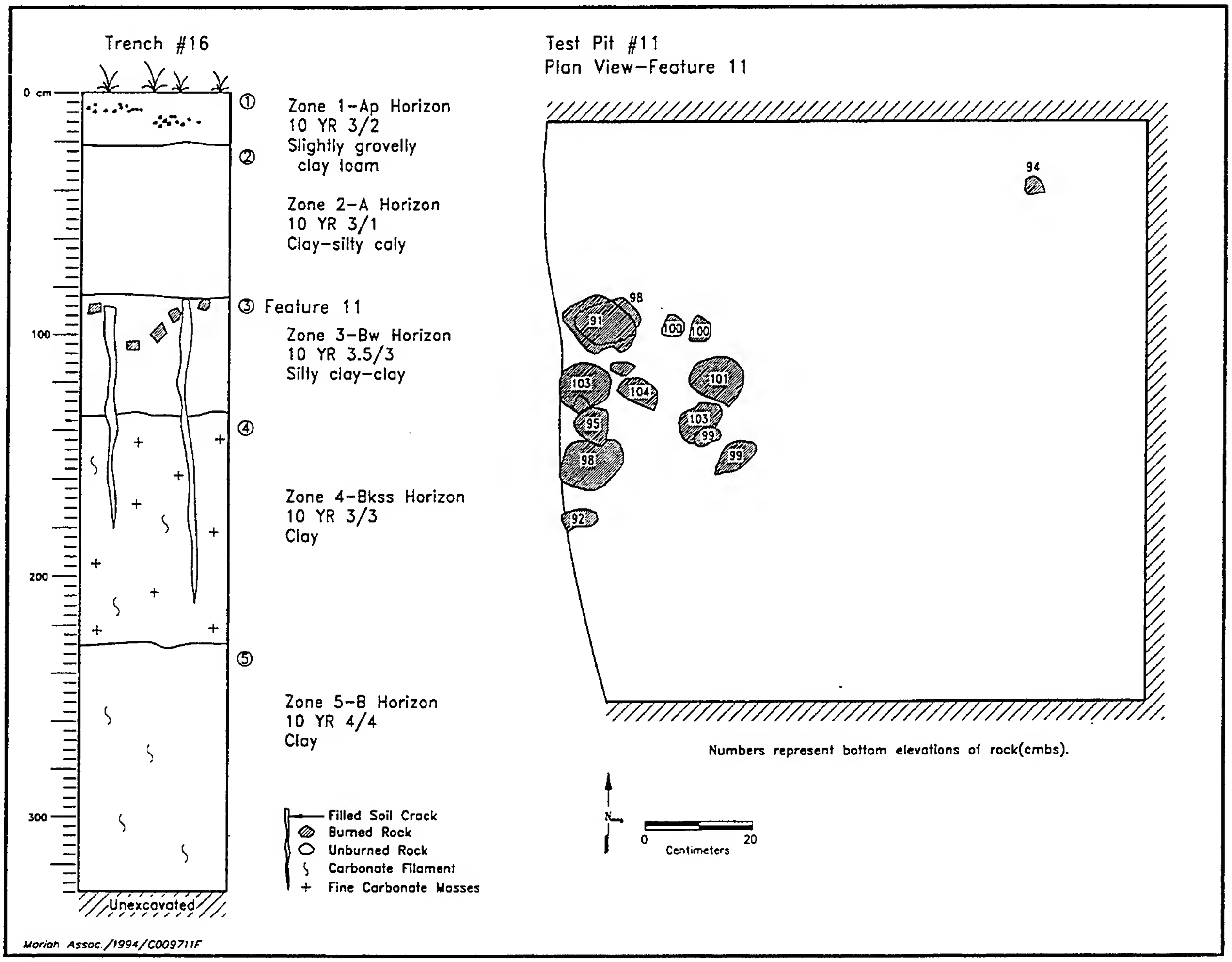

Figure 6.23 Measured Section of BT 16 and Plan of F 11 (105 cmbs), and TP 11, 41CV97.

result of vandalism or animal burrowing. In addition, a semi-circular, charcoal-laden stain (no feature designation assigned) was encountered in the central part of the southern TP boundary at 53 cmbs. The stain measured 12 x 11 x 4 cm, was flat-bottomed, and was still visible in the south wall profile following excavation.

From 60 to 100 cmbs, high densities of artifacts continued to be recovered from F 2, with numerous lithics, bone, mussel shell, and burned rocks found in each level. Most of the burned rocks averaged 5 to 10 cm in size and were angular; however, about 10 larger (10 to 15 cm) angular rocks, about half of which were fire cracked in situ, were discovered from 80 to 95 cmbs. In addition to this cultural material, a Scallorn point and a Marcos point were found in Level 7 and two Darl dart points were recovered from Level 9. At 100 cmbs, a burned rock "pavement," measuring 100 x 22 to 38 cm, was encountered in the southern third of the unit. This was designated F 2B and removed as a cultural unit from 100 to 117 cmbs. This feature consisted of a very compact, discrete concentration of burned rocks composed of about one-third tabular rocks 10 to 20 cm in size and two-thirds angular rocks 5 to 10 cm in size. Construction consisted of two to three layers of overlapping rocks (n=110, 46 kg) with the smaller rocks placed in and around a

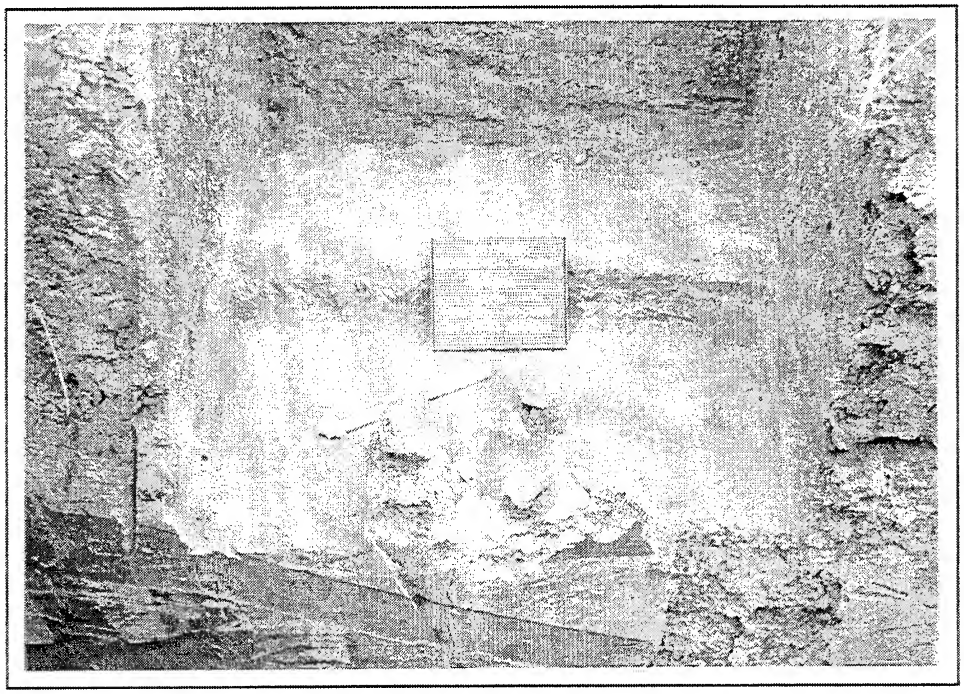

Figure 6.24 Feature 11, 41CV97, Looking Northeast.

framework of the larger, tabular rocks. Several flakes, mussel shell umbos, and bone fragments were found in F 2B. The remainder of the unit adjacent to F 2B, from 100 to 120 cmbs, consisted of F 2 debris, but a marked decrease in cultural material occurred relative to the overlying levels, and most burned rocks were less than 5 cm in diameter.

In Level 13, a transition zone was noted between F 2 and F 2C (a mussel shell lens). The features did overlap and could not be clearly separated in this transition zone, but by 128 to 130 cmbs, the entire unit was considered to be F 2C based on morphology (dense, compact rock construction), low lithic content, ubiquity of mussel shell, and a subtle change in soil color. Some bone (burned and unburned) and lithics, including a Bulverde point, along with numerous shell umbos and burned rocks (5 to 10 cm in size) were recovered from the transition level. Feature 2C extended to 170 cmbs and extended across the entire unit in every level. Artifact recovery included several flakes and unburned bone fragments, numerous mussel shells, and 650 to 700 burned rocks (190 kg). Construction consisted of 4 to 5 layers of horizontally laid, angular and tabular burned rocks averaging 10 to 20 cm in size. Below F 2C, F 2 extended to 230 cmbs. Burned rock counts per level continued to be high, however, individual clasts were much smaller in size (usually less than 5 cm) than in previous levels. Lithic, bone, and mussel shell densities were fairly low. No apparent rock patterning was present. Cultural materials within Levels 24 and 25 were a mere fraction of the amount found in all previous levels. Excavation was discontinued after Level 25 was completed.

As discussed above, several projectile points were recovered from AU 4, all in association with F 2 and 2A, the burned rock midden (Table 6.23). There appears to be no pattern of the parent material represented. A total of 55 specimens were also recovered constituting the general lithic assemblage (Table 6.24). These include an

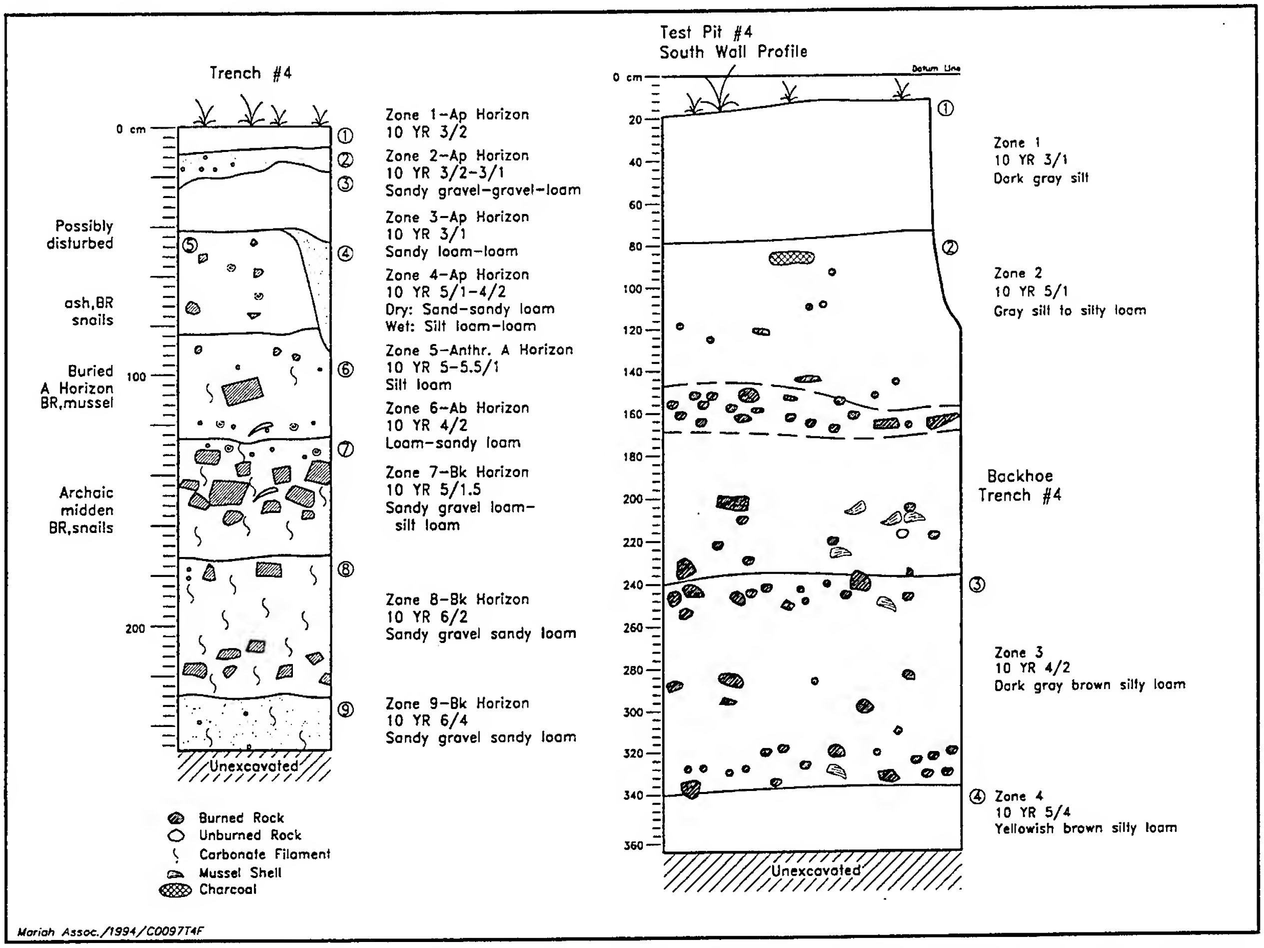

Figure 6.25 Measured Section (Compressed) of BT 4 and Profile of TP 4, South Wall, F 2, 41CV97.

example of the crushing/abrading tool seen in other sites, a multiple platform core, and various unifacial and bifacial tools in stages of manufacture. The highest chert frequency is found in the unknown source materials; the Southeast Range, North Fort, and Cowhouse all equally represented in the lithic assemblage.

Seventeen identified chert types and nine indeterminate categories were included in the debitage recovered from AU 4 (Table 6.25). Overall, slightly less than 14% of the assemblage was identified. When the entire assemblage was considered, the aggregate indeterminates occurred in greater than expected frequency and all of the identified types occurred in less than expected frequencies. When the indeterminates were excluded from consideration, Fort Hood Yellow, Heiner Lake Translucent Brown, Gray/Brown/Green, and Owl Creek Black occurred in greater than expected numbers; Anderson Mountain Gray, Heiner Lake Tan, Fossiliferous Pale Brown, Fort Hood Gray, Cowhouse Mottled, Cowhouse Dark Gray, Cowhouse Mottled/Flecked, and Cowhouse Mottled/Banded occurred in the expected range; and Texas Novaculite, Heiner Lake Blue, Cowhouse Light Gray, Cowhouse Brown Fossiliferous, and Table Rock Flat occurred in less than expected frequency (Table 6.26). This material includes chert characteristic of all four chert provinces, with the greatest number (43%) associated with the North Fort province and the fewest (3%) with the West Fort province. The relative importance of the distant Southeast Range province and the local Cowhouse province again hinges on which of these two areas the Heiner

Lake Translucent Brown material (which occurs in both provinces) is considered to be associated with; if associated with the Cowhouse province, it becomes relatively more important (with 39% of the total in comparison to 13% Southeast Range material), but if considered part of the Southeast Range assemblage, it drops to third overall (with 24% in comparison to 28% Southeast Range).

Size distribution shows the same trends apparent in AU 1 and AU 2, with a modal peak in the overall assemblage that falls in the 0.5 to 0.9 cm range and a modal peak in the 1.2 to 1.8 cm range in the identified subset. Overall, 86% of the assemblage is smaller than 1.8 cm. Cortex distribution is also similar, with 21% of the total assemblage exhibiting cortex, of which 39% are demonstrably abraded, 11% are unabraded, and 51% are indeterminate (Table 6.27).

Once again, the faunal record from the midden was large and diverse (Table 6.28). The majority of remains were unidentifiable fragments from deer-sized mammals, although identified deer and artiodactyl bones were relatively rare. Other recovered taxa include toads and frogs, turtle, colubrid snake, pocket gopher, wood rat, jackrabbit, cottontail, and small unidentified fish. Mussels representing a minimum of six species indicative of a wide range of aquatic environments were also recovered, including one species (*Potamilus purpuratus*) that was only recovered at one other site (41CV1038).

Also of note were several fragments of human bone recovered from the midden in TP 4, Levels 17 and 18. These remains, which consisted of three long bone fragments, two vertebral fragments, and one phalange fragment, appear to represent a juvenile. The remains were not recognized as human in the field and were included in the faunal assemblage submitted to Brian Shaffer, North Texas State University, who made the identification. Upon recognition, all the human remains were immediately returned to Fort Hood DEH to await repatriation.

Table 6.23 Projectile Points, AU 4, 41CV97.

	Lithic Material							
Point Type	06-HL Tan	09-HL Tr Brown	Indet Black	Indet Lt Brown	Indet Lt Gray	Indet Misc.	Indet White	Total
Bulverde	1	0	0	0	0	0	0	1
Darl	1	0	0	0	1	0	0	2
Marcos	0	1	0	0	0	0	0	1
Other Arrow	0	0	0	1	1	2	0	4
Scallorn	0	0	1	1	0	1	1	4
Total	**2**	**1**	**1**	**2**	**2**	**3**	**1**	**12**

6.2.2.5 Site Level Synthesis

Multiple alluvial fills, representing early through late Holocene depositional units, are present within the boundaries of this site. Cultural deposits are common throughout the two younger alluvial deposits (Ford and West Range) at depths greater than 4 m below surface and may extend to depths in excess of 6 m. Cultural deposits in good context were also observed buried within colluvial deposits immediately adjacent to the colluvial slope that forms the northern site boundary. Few of the cultural deposits appeared to have been significantly disturbed by overbank processes resulting in a wide array of excellently preserved archeological assemblages. The presence of multiple small hearth features suggests that dozens of stratigraphically separable occupation surfaces are probably contained within the site sediments. Artifact recovery is generally high, as are associated faunal remains, suggesting that the site contains a wealth of technological, subsistence, and resource procurement data.

Table 6.24 Cores and Nonprojectile Point Lithic Tools, AU 4, 41CV97.

	Core Type	Tool Type										
Lithic Material	multiple platform	complex scraper	early stage biface	late stage biface	Crushing/Battering	other tool	preform	side scraper	uniface	utilized flake	wedge	Total
02-C White	0	0	0	0	0	0	0	0	1	0	0	1
06-HL Tan	1	0	1	0	0	0	0	0	1	1	0	4
07-Foss Pale Brown	0	0	0	0	0	0	0	0	1	0	0	1
08-FH Yellow	0	0	0	0	0	0	4	1	1	1	0	7
09-HL Tr Brown	0	1	0	1	0	1	0	1	0	1	1	6
10-HL Blue	0	0	0	0	0	0	0	0	0	1	0	1
14-FH Gray	2	0	0	0	1	0	0	0	0	0	0	3
15-Gry/Brn/Grn	1	0	0	0	0	0	0	0	0	0	0	1
18-C Mottled	0	1	1	0	0	0	0	0	3	0	0	5
19-C Dr Gray	0	0	0	1	0	0	1	0	0	0	0	2
22-C Mott/Flecks	1	0	1	0	0	0	0	0	0	0	0	2
27-C Novaculite	0	0	0	0	0	0	0	0	1	0	0	1
Indet Dk Brown	0	0	0	0	0	0	0	0	1	1	0	2
Indet Dk Gray	0	0	0	0	0	0	0	1	2	0	0	3
Indet Lt Brown	1	0	2	0	0	0	3	0	3	0	0	9
Indet Lt Gray	1	1	0	0	0	0	1	0	0	0	0	3
Indet Misc.	0	0	0	1	0	0	1	0	1	0	0	3
Indet Mottled	0	0	0	0	0	0	1	0	0	0	0	1
Total	**7**	**3**	**5**	**3**	**1**	**1**	**11**	**3**	**15**	**5**	**1**	**55**

6.2.3 Conclusions and Recommendations

Portions of this site have been damaged. The terrace, most notably across the western two-thirds of the site, appears to have been cultivated based on the presence of an irrigation canal with adjacent berm and the lack of old-growth vegetation. Historic material suggesting military and/or vandal impacts was also found 20 cmbs in two test pits. Therefore, there is little reason to regard the upper 20 cm of deposit as intact, even though cultural material was present. The upper portions of both middens (Fs 1 and 2) have also been severely damaged by vandalism and/or recent activities.

However, intact deposits are present which span the Early Archaic through the Late Prehistoric and, possibly, Protohistoric periods. Within these deposits there are many highly discrete occupations, although the Early Archaic component at the site was not well demonstrated and may be relatively sparse. Projectile points recovered at the site provide support for claims that occupations spanned the Early Archaic through the Late Prehistoric (cf. Turner and Hester 1985). The site preserves abundant faunal remains (including shellfish) in a variety of stratigraphic, paleotopographic, and behavioral contexts.

Table 6.25 Debitage Recovery by Size and Material Type, AU 4, 41CV97.

	Size (cm)							
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	Total
Identified Types								
03-AM Gray	0	0	3	0	1	0	0	4
05-Texas Novac	0	0	0	0	1	2	0	3
06-HL Tan	0	0	1	7	1	1	0	10
07-Foss Pale Brown	0	0	1	2	3	1	0	7
08-FH Yellow	2	3	5	13	2	2	0	27
09-HL Tr Brown	0	6	4	10	3	0	0	23
10-HL Blue	0	0	0	1	2	0	0	3
14-FH Gray	0	0	0	1	0	3	0	4
15-Gry/Brn/Grn	0	2	3	5	3	3	0	16
17-Owl Crk Black	2	3	8	2	1	2	0	18
18-C Mottled	0	0	0	1	3	1	0	5
19-C Dr Gray	0	0	0	4	4	0	0	8
21-C Lgt Gray	0	0	0	1	0	1	0	2
22-C Mott/Flecks	0	0	0	1	3	4	0	8
23-C Mott/Banded	0	0	0	1	7	2	0	10
24-C Br Fossil	0	0	0	0	1	0	0	1
28-Table Rock Flat	0	0	0	2	0	0	0	2
Subtotal	*4*	*14*	*25*	*51*	*35*	*22*	*0*	*151*
Unidentified Types								
Indet Black	6	1	6	1	0	0	0	14
Indet Dk Brown	26	82	42	45	9	4	0	208
Indet Dk Gray	0	9	6	2	7	0	0	24
Indet Lt Brown	38	171	137	95	51	10	2	504
Indet Lt Gray	3	15	13	5	1	1	0	38
Indet Misc.	40	47	30	13	3	0	0	133
Indet Mottled	0	1	2	3	2	2	0	10
Indet Trans	5	1	1	1	0	0	0	8
Indet White	0	3	1	0	0	0	0	4
Subtotal	*118*	*330*	*238*	*165*	*73*	*17*	*2*	*943*
Total	**122**	**344**	**263**	**216**	**108**	**39**	**2**	**1094**

Based on artifact recovery and feature types, it appears that the site contains a large, buried field of middens and hearths. An impressive array of fire-oriented technologies preserved at the site includes burned-earth pits, burned rock hearths of various dimensions and shapes, and burned rock midden deposits with internal structure. This aspect of the site alone provides an unusual opportunity to examine in detail how prehistoric people incorporated burned rock and other fire technologies into their activities (cf. Howard 1991; Collins 1991; Ellis 1994a). Abundant, well-stratified lithic assemblages provide a basis for identifying other technological systems (per

Table 6.26 Binomial Statistic Results, AU 4, 41CV97.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
03-AM Gray	4	46	76	less	4	15	expected
05-Texas Novac	3	46	76	less	4	15	less
06-HL Tan	10	46	76	less	4	15	expected
07-Foss Pale Brown	7	46	76	less	4	15	expected
08-FH Yellow	27	46	76	less	4	15	more
09-HL Tr Brown	23	46	76	less	4	15	more
10-HL Blue	3	46	76	less	4	15	less
14-FH Gray	4	46	76	less	4	15	expected
15-Gry/Brn/Grn	16	46	76	less	4	15	more
17-Owl Crk Black	18	46	76	less	4	15	more
18-C Mottled	5	46	76	less	4	15	expected
19-C Dr Gray	8	46	76	less	4	15	expected
21-C Lgt Gray	2	46	76	less	4	15	less
22-C Mott/Flecks	8	46	76	less	4	15	expected
23-C Mott/Banded	10	46	76	less	4	15	expected
24-C Br Fossil	1	46	76	less	4	15	less
28-Table Rock Flat	2	46	76	less	4	15	less
Total Indet	943	46	76	more	na	na	na

procedures in Ellis 1994b) and for identifying patterns of chert resource use. In short, surficial impacts notwithstanding, this site is an extremely valuable archeological resource relative to the research design and significance standards for Fort Hood.

On the basis of the foregoing, site 41CV97 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because many known eligible components are relatively deeply buried, they are fairly well protected from training and other activities that affect only the surface of the site. However, intact features and occupations occur below the probable plow zone, but at less than 60 cmbs. Impacts from heavy vehicles, especially if the ground is wet, could seriously affect these archeological deposits. Indeed, severe compaction from heavy vehicles was observed in a laterally extensive, 50 cm thick zone in the profile of BT 2. Although no shallow Protohistoric occupations were observed, there is a chance that such may be present on the east end of the site. If such occupations are present, compaction or similar traffic impacts would adversely affect rarely documented archeological phenomenon. Adverse impacts from uncontrolled excavations (as evidenced by extensive vandalism of F 2) and from erosion (as evidenced by F 1) also pose substantial threats. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, (2) prevent mechanical or manual excavations by military personnel, and (3) minimize the impact of traffic on the alluvial surfaces.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et

Table 6.27 Debitage Cortex Characteristics by Material Type, AU 4, 41CV97.

	All Cortex		Partial Cortex					
Lithic Material	Abraded	Unabraded	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types								
03-AM Gray	0	0	0	0	0	4	0	4
05-Texas Novac	0	0	2	0	1	0	0	3
06-HL Tan	0	0	0	0	0	10	0	10
07-Foss Pale Brown	0	0	2	1	2	1	1	7
08-FH Yellow	0	0	2	0	4	21	0	27
09-HL Tr Brown	0	0	2	1	2	16	2	23
10-HL Blue	0	0	0	0	0	3	0	3
14-FH Gray	0	0	2	0	1	1	0	4
15-Gry/Brn/Grn	0	0	1	0	4	11	0	16
17-Owl Crk Black	0	0	2	2	0	14	0	18
18-C Mottled	0	0	1	0	4	0	0	5
19-C Dr Gray	0	0	3	0	2	3	0	8
21-C Lgt Gray	0	0	0	0	0	2	0	2
22-C Mott/Flecks	0	0	3	0	3	2	0	8
23-C Mott/Banded	0	0	5	0	2	3	0	10
24-C Br Fossil	0	0	0	0	0	1	0	1
28-Table Rock Flat	0	0	2	0	0	0	0	2
Subtotal	*0*	*0*	*27*	*4*	*25*	*92*	*3*	*151*
Unidentified Types								
Indet Black	0	0	1	0	0	13	0	14
Indet Dk Brown	0	0	2	1	15	190	0	208
Indet Dk Gray	0	0	2	0	1	21	0	24
Indet Lt Brown	6	1	42	14	48	387	6	504
Indet Lt Gray	0	0	1	0	1	36	0	38
Indet Misc.	0	0	3	0	24	103	3	133
Indet Mottled	0	0	4	3	2	1	0	10
Indet Trans	0	0	0	1	0	7	0	8
Indet White	0	0	0	0	0	4	0	4
Subtotal	*6*	*1*	*55*	*19*	*91*	*762*	*9*	*943*
Total	**6**	**1**	**82**	**23**	**116**	**854**	**12**	**1094**

al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of blocks, exposing buried features and living surfaces, up to 350 m^2 in area. Known occupations and features occur at varying depths at the site in strata ranging from about 10 to 20 cm thick, to more than 150 cm thick. Blocks should be distributed among all depositional units and Fs 1 and 2. Assuming manual excavation of deposits

Table 6.28 Faunal Recovery, AU 4, 41CV97.

	Element																								
Vertebrates	Cranium	Distal phalange	Dorsal vertebra	Femur	Humerus	Indeterminate	Long bone	Mandible	Metapodial	Metatarsal	Metatarsal 3	Middle phalange	Pelvis	Permanent tooth	Plastron	Proximal Phalan	Radius	Rib	Carapace	Tibia	Tooth	Ulna	left	right	Total
Anura	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Artiodactyla	0	0	0	1	1	4	0	0	4	0	0	1	0	0	0	3	1	0	0	0	2	0	0	0	17
Colubridea	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Geomys bursarius	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
Leporidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Lepus californicus	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3
Mammalia	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Mammalia (lg/vlg)	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Mammalia (med/lg)	1	0	0	0	0	262	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	265
Mammalia (medium)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Mammalia (sm/med)	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Neotoma sp.	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Odocoileus sp.	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	4
Osteichthyes (sm)	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sylvilagus sp.	0	0	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	5
Testudinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	6
Vertebrata	0	0	0	0	0	155	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	157
Total	**3**	**1**	**1**	**1**	**5**	**427**	**1**	**1**	**5**	**1**	**1**	**1**	**1**	**2**	**1**	**3**	**5**	**1**	**6**	**1**	**4**	**1**	**0**	**0**	**473**
Bivalves																									
Amblema plicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	13	32
Ambleminae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	38	64
Lampsilinae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	16	29
Lampsilis hydiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Lampsilis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Potamilus purpuratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Quadrula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Toxolasma sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Toxolasma texasensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Tritigonia verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	6
Unionacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	12
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**70**	**79**	**149**

with an average thickness of 1 m in each block, approximate mitigation volume would equal 350 m^2.

Larger-scale mitigation efforts at 41CV97 may well yield extraordinarily robust data bases which contribute quantum, rather than incremental, advances to our knowledge of Fort Hood prehistory. The above estimated mitigation volume should therefore be regarded as a minimum relative to the site's capacity to yield valuable information. Hence, we also recommend that any eventual

mitigation at this site involve more excavation than the above estimate, and that it be pursued with the intent to acquire data sets that will become centerpieces for subsequent research at other sites on Fort Hood. Even at the current (1994), poor state of development of prehistory on Fort Hood, large-scale mitigation would contribute substantially to resolution of general research issues for some time periods, thereby establishing a basis for making a transition to highly topic-specific historic contexts.

6.3 SITE 41CV137

6.3.1 Introduction

In late January 1994, Mariah conducted test excavations at site 41CV137. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.3.1.1 Location and Description

Site 41CV137 is located near the head of a small spring-fed drainage that flows into a branch of Henson Creek. The site is situated on the north terrace of this small drainage and extends up onto a hill slope (Figures 6.26 and 6.27). Overall, maximum site dimensions are 100 x 30 m (about 3,000 m^2, or 0.7 acres). For purposes of this report, the site is considered part of the Shell Mountain site group.

6.3.1.2 Previous Work

Thomas and White originally recorded the site 14 December 1978. The site was described as a vandalized burned rock midden located at the base of a northeast-flowing draw. Artifacts observed included burned rock and chert debitage, biface fragments, and an Ensor dart point. Snail shells and several varieties of mussel shells were also observed. Overall, vehicular traffic and vandalism were estimated to have disturbed approximately 50% of the site.

Moore and Strychalski monitored the site on 13 February 1986 and estimated that the site was 90% disturbed by vandalism, erosion, and miscellaneous military activities. Protection of the site was recommended based on the potential of the site to contain good archeological information.

In February 1992, Frederick and Quigg revisited and reevaluated the site based on geomorphic and archeological observations. An abundance of burned rock, debitage, tools, and a low density of burned bone and mussel shell were observed throughout the vandalized midden. Two Late Archaic projectile points were collected. Although the majority of the midden was thought to be disturbed, potential for intact deposits was judged to still exist. Based on the presence of the midden, depth of deposit, and potential for in situ cultural remains, five shovel tests were excavated to depths of up to 80 cmbs. All of the tests were positive and produced a total of 1,505 lithics, 1,008 burned rocks, 117 bone fragments, 4 mussel shell fragments, 25 pieces of glass, and 2 metal fragments. Glass was found to a depth of 40 cmbs, indicating disturbance to at least this depth in the upper portion of the midden. Based on testing results, in situ cultural material was considered to be potentially present, but the site's eligibility status was uncertain. The site was recommended for avoidance or for formal testing if avoidance was not possible. Two to five backhoe trenches and two to four manually excavated test pits were recommended for formal testing to determine NRHP eligibility (Trierweiler 1994:A760-A767).

6.3.1.3 New Work

Because backhoe trenching was recommended and the site is within the endangered species habitat, the site was first visited by Gil Eckrich (DEH, Fish and Wildlife) and Karl Kleinbach (Mariah) on 29 December 1993. Based on this field check, Eckrich granted permission to proceed with the

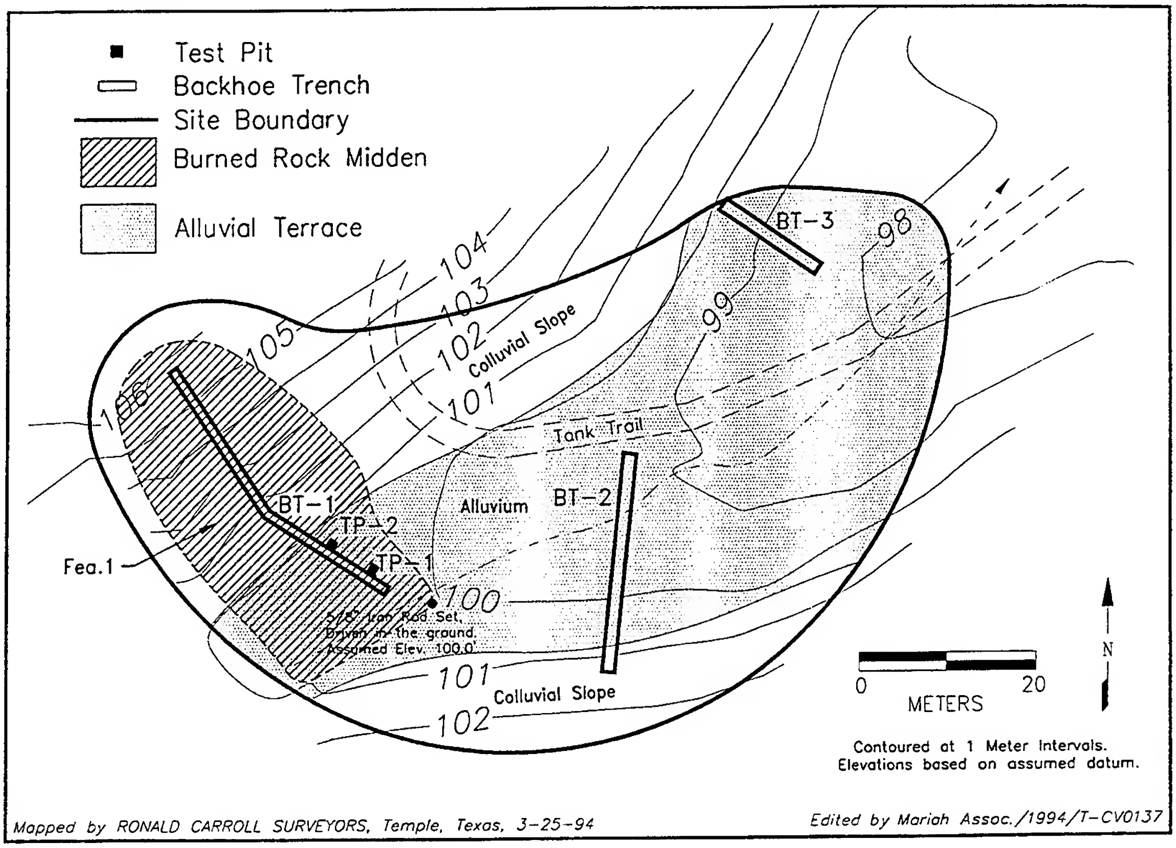

Figure 6.26 Site Map of 41CV137.

archeological testing phase, including trenching and subsequent test pit excavations. No restrictions were placed upon the scope of fieldwork.

The vandalized burned rock midden identified by previous investigators was designated F 1. Three backhoe trenches (BT 1, 2, and 3) and two test pits (TPs 1 and 2) were excavated during formal testing (Table 6.29). Trench 1 was a long trench that spanned the low terrace surface and the midden mantling the lower slope and toeslope. Numerous dart points, bifaces, and bones were collected from the backhoe backdirt pile. Trenches 2 and 3 were excavated from the center of the valley to the lower toeslope approximately 25 m and 50 m downstream of BT 1, respectively. Test pits 1 and 2 were offset from BT 1 on the alluvial terrace. Recovered cultural material is summarized in Table 6.30.

6.3.2 Results

Trench 1 extended from the margin of the drainage, across the low terrace, and up the colluvial toeslope and lower slope to the upslope edge of the midden. Two sediment columns were recorded in the trench. The upslope column was positioned to describe the midden profile on the slope, while the lower column described the terrace deposits.

The trench was approximately 60 cm deep on the slope, and revealed two gross stratigraphic/pedologic zones (Figure 6.28). Zone 1 was 40 cm thick and consisted of "typical" anthropically modified midden sediments. It was composed of abundant burned rock and lithic debitage in a black (10YR 2/1), friable, weak granular to massive gravelly loam matrix. As with most vandalized middens, the extent of disturbance was very difficult to gauge because the extremely

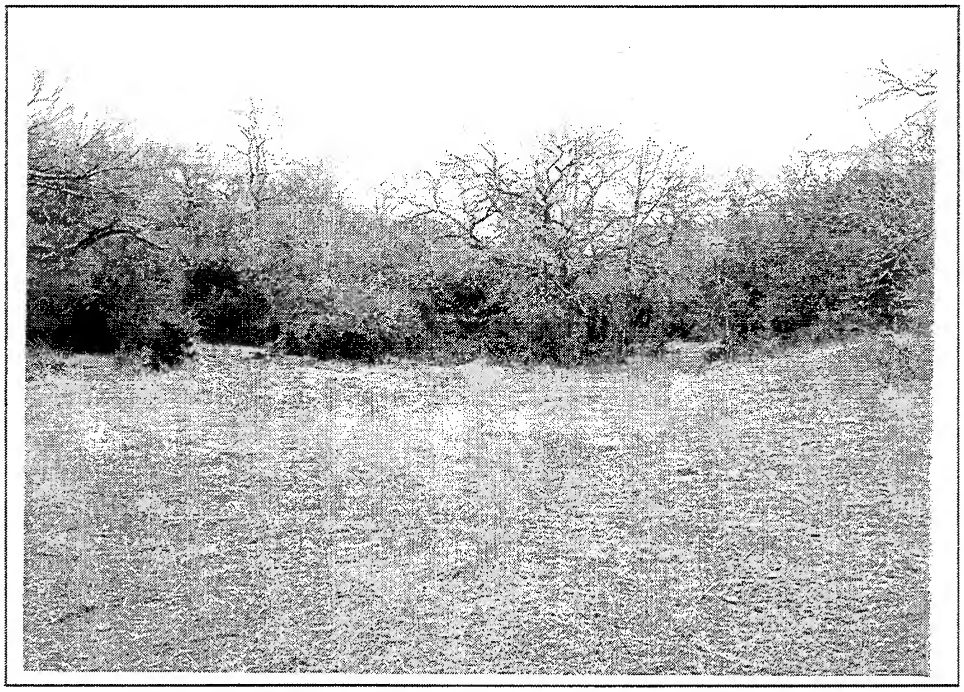

Figure 6.27 Overview of Site 41CV137, Looking South.

dark sediment and chaotic internal structure made identification of intrusive pits in section practically impossible. However, large quantities of slightly decomposed organic matter (including leaves and sticks) were observed at depth in a number of places, and the fill was very loose, suggesting that most, if not all, of the deposit on the slope has been vandalized. Zone 2 consisted of very dark grayish brown (10YR 3/2) massive sandy loam containing abundant unburned and occasional burned limestone clasts. It is interpreted as a mantle of Holocene-age colluvium, and contained no observed cultural material in primary context. The substrate was slightly to moderately weathered limestone. The overall profile exhibited an A-Bw-R sequence with substantial disturbance of the A horizon.

The downslope profile in BT 1 recorded a section through the alluvial terrace. Two distinct fills and a clear buried paleosol were noted in an A-Bw-2Bwk-2C profile. Zone 1 extended to 85 cmbs and essentially consisted of an extension of the midden upslope onto the terrace. It was composed of abundant burned rock and flakes in a black (10YR 2/1), friable, granular loam. The degree of structural development decreased with depth in the zone. Zone 2 consisted of massive, very dark grayish brown (10YR 3/2) sandy loam and was 20 cm thick. Zone 3 formed the buried paleosol and was approximately 70 cm thick. It was composed of dark grayish brown (10YR 4/2), angular,

Table 6.29 List of Treatment Units, 41CV137.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	35	0.8	280
1	BT 2	25	0.8	300
1	BT 3	15	0.8	260
1	TP 1	1.0	1.0	120
1	TP 2	1.0	1.0	170

Table 6.30 Artifact Recovery by Test Pit, 41CV137.

	TEST PIT 1					TEST PIT 2				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	24	151	1	0(14)	0	36	0	8	0(0)
2	0	41	283	5	0(26)					
3	0	39	210	4	150(27)					
4	0	258	204	25	60(12)					
5	0	20	193	4	45(0.8)			not screened		
6	0	0	295	0	55(14)					
7	0	54	278	5	55(13)					
8	0	58	324	8	160(42)					
9	0	17	344	5	220(48)	0	47	212	5	164(18)
10	0	23	281	7	115(23)	0	36	138	6	93(16)
11	1	16	363	2	56(11)	0	38	239	0	127(19)
12	0	1	47	0	10(1.5)	0	30	202	6	56(9)
13						0	26	185	3	75(32)
14						0	30	120	2	71(28)
15						1	43	174	2	50(6)
16						0	28	82	1	21(2)
17						0	26	35	1	10(1.5)
18						0	0	0	0	
19						0	0	0	0	
20						0	0	0	0	
21						0	0	0	0	
22						0	0	0	0	
23						0	0	0	1	
TOTAL	1	551	2973	66	926(232.3)	1	340	1387	35	667(131.5)

blocky, clay loam containing calcareous flecks and filaments and many coarse calcareous sand grains. A clear, stratified occupation was noted in the upper part of the zone. This occupation was characterized by at least one burned rock feature and abundant flakes, burned rock, bone, mussel shell, and dispersed flecks of charcoal in the trench wall. Light flakes and burned rock were dispersed throughout the zone. The structure decreased with depth, finally grading into Zone 4, which consisted of approximately 45 cm of massive, dark grayish brown (10YR 4/2) gravelly loam. Burned rock was also dispersed throughout this zone. The basal zone was 50 cm thick and consisted of dark brown (10YR 3/3), massive gravelly loam to gravelly clay loam. It also contained a few dispersed burned rocks.

Test pit 1 was offset from the east wall of BT 1, just above the drainage, at an area containing structured soil at the lower portion of the midden (F 1), and excavated to the base of the midden (120 cmbs). Although hundreds of flakes, numerous bone fragments and burned rocks, and several dart points were recovered from each level excavated from 0 to 30 cmbs (Table 6.30), these

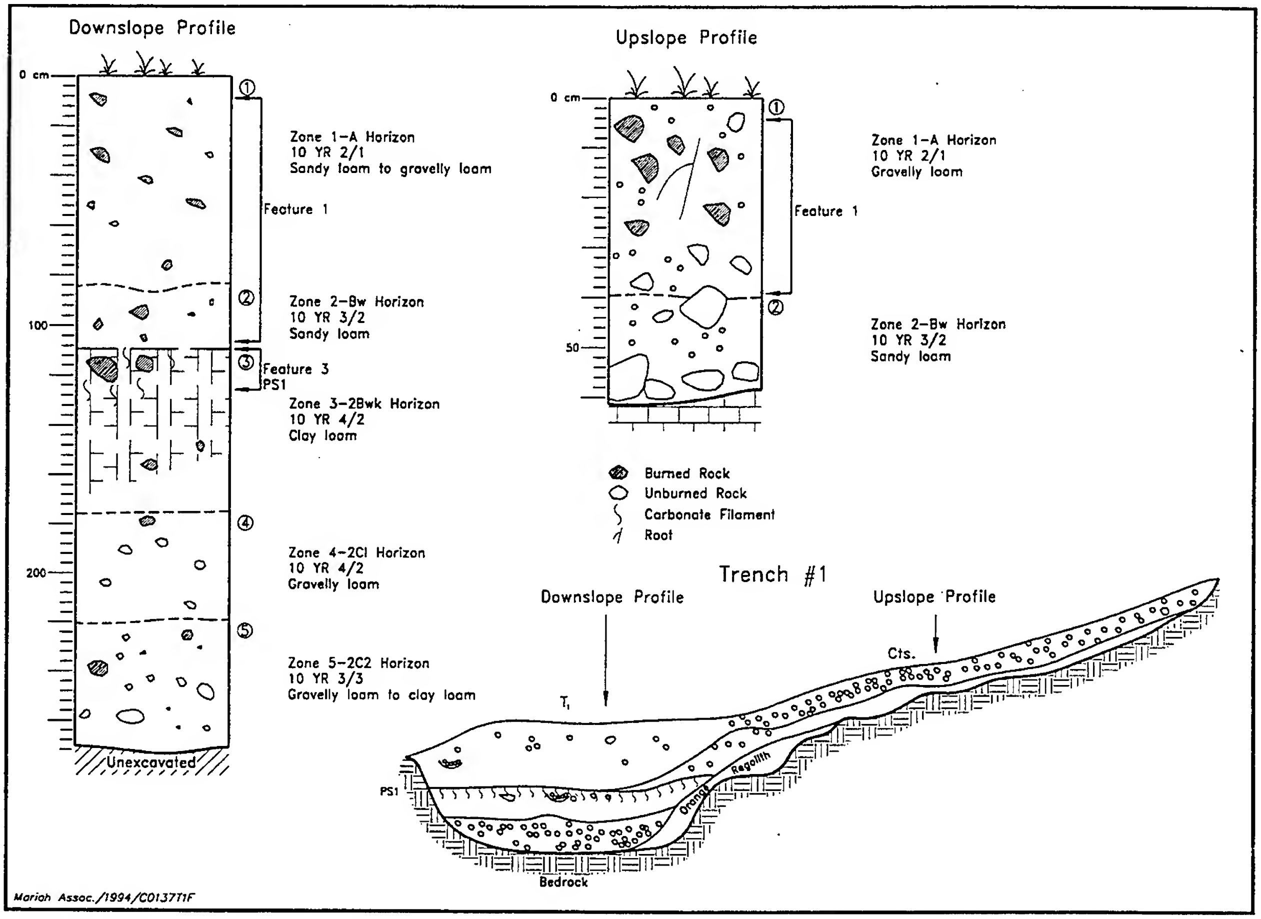

Figure 6.28 Schematic Profile and Measured Sections, BT 1, 41CV137.

levels were definitely disturbed by vandals to at least some degree. Disturbance was evidenced by loose fill containing recent leaf litter and historic items (metal fragments and pieces of whiteware), and was interpreted as probably affecting the majority, if not all, of the pit. From 30 to 40 cmbs, a cache of tools and eight broken dart points (F 2) were recovered along with over 100 flakes, 30 bone fragments, and 60 burned rocks. Although the fill remained loose within this level, a determination of whether this was a prehistoric feature or the result of vandalism was not reached until Level 5 (40 to 50 cmbs) was excavated. Recovery from Level 5 included over 150 flakes, 20 bone fragments, 45 burned rocks, an arrow point, and several pieces of metal, the latter of which suggests that F 2 was probably the result of vandalism. Again, from 50 to 70 cmbs, an abundance of prehistoric cultural material was recovered from loose fill, suggesting that these levels may have been at least somewhat disturbed by vandalism. At 70 cmbs, the entire unit was within the structured clay loam containing the calcium carbonate filaments observed within the east wall of BT 1. From 70 cmbs to 110 cmbs, hundreds of flakes, 8 dart points, high frequencies of burned rocks, and over 20 bone fragments were recovered from each level excavated. In addition to these artifacts, a mussel shell was recovered from 100 to 110 cmbs. A soil change occurred between 110 to 120 cmbs shifting from the dark midden matrix to a gravelly brown clay loam. Moreover, the amount of cultural material decreased to less than half of that found in the previous levels. No evidence of vandalism or major disturbance was observed from 70 to 120

cmbs. Approximately 560 burned rocks (126 kg), most of which were less than 10 cm in size, were recovered from these lower intact levels.

Test pit 2 was also offset from the east wall of BT 1, above a concentration of burned rock (F 3) that was observed below the midden (F 1) in the profile of BT 1. The test pit was excavated to 170 cmbs. At this portion of the midden in the trench profile, the upper 100 to 110 cm exhibited strong evidence of vandalism, including incorporated historic material and a very loose matrix. Therefore, the upper 80 cm of fill was removed unscreened, however, a Pedernales was collected, and formal excavation began at 80 cmbs. From 80 to 110 cmbs, hundreds of flakes and burned rocks, numerous bone fragments, and three dart points were recovered from a very loose fill, rendering their context somewhat questionable. From 110 to 120 cmbs, a more compact matrix was encountered, and is tentatively interpreted as an intact portion of F 1. Recovery from this level included over 200 flakes, 30 bone fragments, 56 burned rocks (9 kg), and a Pedernales dart point. This level also contained the base of F 1, which essentially rested directly on the buried paleosol. The top of a lower burned rock midden (F 3) was encountered in this unit at 122 cmbs and the base was reached at 147 cmbs. The feature covered the entire limits of the test pit and continued into all of the test pit walls (Figure 6.29). Approximately 200 burned rocks (66 kg), most of which were larger than those found in F 1 (up to 15 x 10 cm), were recovered from F 3. Other recovered artifacts include approximately 480 flakes, several tools and cores, 99 bone fragments, a mussel shell, a charred hackberry seed, a well-made biface, one Pedernales, and one untyped dart point. No obvious disturbances were observed during excavation and the feature appeared to be intact.

One radiocarbon age on charcoal collected from F 3 (Level 15) yielded a corrected age of 3630 ± 60 BP (Beta b-75155), suggesting that the feature dates to the Middle Archaic. Additional chronometric data is provided by a series of eight A/I analyses of *Rabdotus* snails collected from the same level. The values from these snails exhibited strong clustering, with seven of the eight yielding values between 0.0702 and 0.0801, and one outlier yielding a value of 0.146. Regression with dated snails suggests that the seven clustered values are roughly equivalent to radiocarbon ages ranging from 2800 to 3250 BP. Because the site is situated in a narrow, north-facing valley, there is reason to suspect that the rate of epimerization may have been significantly slower than in the area as a whole, which could explain the small discrepancy between the radiocarbon age and radiocarbon-equivalent A/I age (see Section 7.5). In any case, a Middle Archaic age for the feature is supported.

Below F 3, artifact frequencies decreased dramatically from 150 to 170 cmbs. Gravels were noted in these levels, with size and amount increasing with depth. At 170 cmbs, the fill contained dense gravels and excavation was terminated. A Marcos point was collected from the trench wall from 220 to 230 cmbs, below F 3. This Late Archaic point is inconsistent with the age of the overlying feature. Nevertheless, the majority of the data imply that the terrace fill aggraded relatively rapidly following the Altithermal, and is thus roughly equivalent with Nordt's (1992) lower West Range fill.

Trench 2 was excavated 25 m east of F 1, on the south side of the small drainage. It was composed of interfingered gravelly late Holocene alluvium and colluvium. Five gross zones were noted in the overall exposure; however, at no one location did all five of these zones occur in a single column. Upslope, the trench exhibited an A-AB-Bk-2Bkb profile, while downslope it exhibited an A-Bk-C profile. Zone 1 consisted of a surficial mantle of black (10YR 2/1) gravelly clay loam up to 50 cm thick that spanned the entire length of the trench. It appears to represent an admixture of alluvium and colluvium. Zone 2 consisted of a very dark grayish brown (10YR 3/2) wedge of gravelly clay loam colluvium in the upslope end of the trench. It was up to approximately 80 cm thick and interfingered with Zone 3 downslope. Zone 3 lay directly under Zone 1 at the downslope end of the

trench and consisted of dark grayish brown (10YR 4/2), weak blocky gravelly clay containing common fine carbonate filaments. It was up to 115 cm thick and also appeared to be an alluvial/colluvial admixture consisting of both individual clasts and extensive alluvial stringers floating in the matrix. Zone 4 was similar, but exhibited less structure and fewer filaments. It was up to 115 cm thick and was the deepest zone exposed on the downslope end of the trench. Zone 5 consisted of an inset wedge of gravelly clay alluvium containing fine carbonate nodules exposed in the middle section of the trench.

Very little cultural material was observed in the trench. Several burned rocks and a few flakes were observed within Zones 3 and 4, but this material appeared to be in secondary context. For this reason, no manual excavation units were placed off of BT 2.

Trench 3 was excavated approximately 50 m east of F 1, on a relatively high spot on the sloping T_1 surface, north of the small drainage. It revealed a heavily calcified, truncated alluvial/colluvial profile of probable Late Pleistocene age overlain by a thick wedge of Holocene alluvium mixed with some slopewash and colluvium. Zones 1 and 2 comprised the Holocene alluvial wedge. Zone 1 was 50 cm thick at the measured section but thickened downslope and pinched out upslope. It was composed of black (10YR 2/1) granular loam to gravelly loam. Zone 2 also thinned upslope and thickened downslope. It was composed of very dark grayish brown (10YR 3/2), massive gravelly clay loam and contained common carbonate filaments in the matrix. Zone 3 lay below a distinct, dipping truncation surface and consisted of up to a meter of light yellowish brown (10YR 6/4) silty loam containing up to 50% matrix carbonate (late Stage II-early Stage III carbonate horizon). This horizon graded into massive, dark yellowish brown (10YR 4/6) slightly gravelly loam that extended to the base of the trench. The only cultural material observed in the trench was a few small, dispersed burned limestone clasts in the upper zones that were probably washed in from upstream. Due to the lack of cultural material, no hand excavations were placed in association with BT 3.

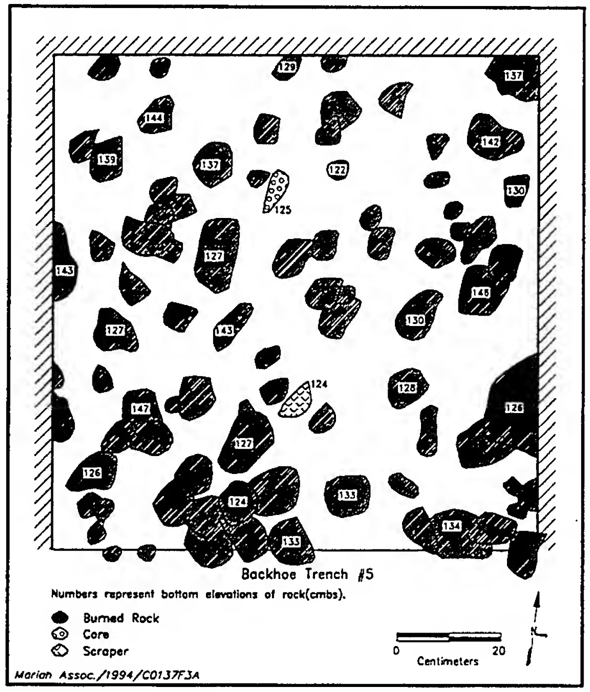

Figure 6.29 Plan of F 3 (130 cmbs), TP 2, 41CV137.

A total of 42 projectile points was recovered from site 41CV137. A large portion of them were recovered from the BT excavations and the rest in association with deposits of varied integrity. Trench 1 resulted in 13 dart points, eight of which are Late Archaic Castroville. Feature 1, a burned rock midden deposit, yielded 17 points ranging from Early Archaic (Bulverde) to a Transitional Archaic (Darl), and one untyped arrow point. Taken as a whole, the projectile points assemblage is representative of utilization of most of the base's chert sources with high frequencies of Heiner Lake Tan and Fort Hood Yellow and seven indeterminate chert categories (Table 6.31).

The chipped stone general assemblage contains 70 specimens of various tool types and raw materials (Table 6.32). Of interest is the presence of a crusher/abrader, an adze, and a wedge. These tools probably represent some type of wood

Table 6.31 Projectile Points, AU 1, 41CV137.

	Lithic Material																
Point Type	06-HL Tan	08-FH Yellow	09-HL Tr Brown	11-ER Flat	13-ER Flecked	14-FH Gray	15-Gry/Brn/Grn	17-Owl Crk Black	19-C Dr Gray	Indet Black	Indet Dk Brown	Indet Dk Gray	Indet Lt Brown	Indet Lt Gray	Indet Misc.	Indet Trans	Total
Bulverde	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	3
Castroville	2	2	1	0	1	1	0	0	0	1	0	0	0	0	0	1	9
Darl	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3
Edgewood	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Ensor	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
Lange	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Marcos	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Marshall	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
Montell	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	3
Other Arrow	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Other Dart	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	6
Pedernales	4	0	0	0	0	0	1	0	0	0	1	0	2	0	0	0	8
Total	**9**	**7**	**3**	**1**	**1**	**2**	**2**	**2**	**1**	**2**	**1**	**3**	**4**	**1**	**2**	**1**	**42**

working or vegetal material processing. Also of note are the 18 preforms, nine of which are made of the Fort Hood Yellow material. Eleven of 18 preforms are from TP 1 and five from TP 2; six of the 12 preforms could have been projectile point manufacturing discards.

Three bone tools were recovered from the excavations. They consist of an awl made from a mammal bone, and two indeterminate types identified only as Order Artiodactyl and the other only confirmed to be modified bone.

Sixteen identified chert types and nine indeterminate chert categories were identified in the debitage from 41CV137 (Table 6.33). Roughly 42% of the recovered assemblage was identified. When the entire assemblage was considered, the aggregate indeterminates, Heiner Lake Tan, and Fort Hood Yellow occurred in greater than expected frequencies; Owl Creek Black occurred in expected frequency; and the remainder of identified types occurred in less than expected frequencies. When the indeterminates were excluded, Heiner Lake Tan, Fort Hood Yellow, and Owl Creek Black occurred in greater than expected frequencies; while Heiner Lake Blue, Cowhouse White, Anderson Mountain Gray, Fossiliferous Pale Brown, Heiner Lake Translucent Brown, East Range Flecked, Fort Hood Gray, Gray/Brown/Green, Cowhouse Mottled, Cowhouse Dark Gray, Cowhouse Mottled/Flecked, Cowhouse Mottled/Banded, and Table Rock Flat occurred in less than expected frequencies (Table 6.34). Indeterminates were dominated by light brown, dark brown, light gray, and dark gray flakes that probably represent a wide variety of identified and unidentified chert varieties.

All four chert provinces were represented in the identified fraction. The dominant province represented was North Fort, which consisted of

Table 6.32 Cores and Nonprojectile Point Lithic Tools, AU 1, 41CV137.

	Core Type	Tool Type												
Lithic Material	multiple platform	adze	Crushing/Battering	drill	early stage biface	end scraper	late stage biface	middle stage biface	preform	side scraper	uniface	utilized flake	wedge	Total
06-HL Tan	0	0	1	0	1	5	12	4	9	1	2	1	0	36
08-FH Yellow	0	0	0	0	0	0	3	1	2	0	0	0	0	6
09-HL Tr Brown	0	0	0	0	0	0	0	1	0	0	0	0	0	1
10-HL Blue	0	0	0	0	0	0	1	0	0	0	0	0	0	1
13-ER Flecked	0	0	0	0	0	0	1	0	0	0	0	0	0	1
14-FH Gray	0	0	0	0	0	0	1	0	0	0	0	0	0	1
15-Gry/Brn/Grn	0	0	0	0	0	0	0	0	2	0	0	0	0	2
17-Owl Crk Black	0	0	0	0	0	0	3	0	4	0	0	0	0	7
18-C Mottled	1	0	0	0	0	0	0	0	0	0	0	0	1	2
22-C Mott/Flecks	0	0	0	0	0	0	1	2	0	0	0	0	0	3
Indet Black	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Indet Dk Brown	1	1	0	1	0	0	2	0	0	0	2	0	0	7
Indet Dk Gray	0	0	0	1	0	0	1	0	1	0	0	0	0	3
Indet Lt Brown	1	0	0	0	0	0	3	0	0	0	0	1	0	5
Indet Misc.	0	0	0	0	0	0	1	1	0	0	0	0	0	2
Indet Mottled	1	0	0	0	0	0	1	0	0	0	0	0	0	2
Total	**4**	**1**	**1**	**2**	**1**	**5**	**31**	**9**	**18**	**1**	**4**	**2**	**1**	**80**

four identified types comprising roughly 75% of the identified fraction of the assemblage. Southeast Range was next, with five types that represent approximately 19% of the identified total. The Cowhouse province was represented by five identified types (including Heiner Lake Translucent Brown, which is associated here rather than with the Southeast Range on the basis of proximity) that comprise roughly 5% of the total. Despite its proximity, the West Fort province is represented by one type that comprises less than 1% of the identified total.

The majority of recovered debitage (83%) was between 0.5 and 1.8 cm in size, suggesting that latter stage reduction activity was dominant. This conclusion is supported by the fact that 93.5% of the material was completely decortified. Of the small fraction of flakes with cortex, 53% were obviously stream abraded, 28% were unabraded, and 19% were indeterminate, indicating that stream cobbles were an important source for that small fraction of material that was initially reduced at the site (Table 6.35).

In addition to the chert assemblage, a single small flake of obsidian was recovered from a flotation sample taken of the F 1 matrix. Although the context of the flake is questionable because the majority of F 1 appears to have been vandalized and/or colluvially reworked, this material is significant because it is a clear indication of long-

Table 6.33 Debitage Recovery by Size and Material Type, AU 1, 41CV137.

	Size (cm)							
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	Total
Identified Types								
01-HL Blue(l)	0	0	0	0	0	1	0	1
02-C White	0	0	0	0	5	0	0	5
03-AM Gray	0	1	5	2	2	0	0	10
06-HL Tan	0	93	61	80	58	33	0	325
07-Foss Pale Brown	0	2	3	1	2	0	0	8
08-FH Yellow	35	383	304	284	96	18	0	1120
09-HL Tr Brown	0	0	2	6	0	1	0	9
13-ER Flecked	0	0	0	1	1	1	0	3
14-FH Gray	0	0	7	0	3	1	0	11
15-Gry/Brn/Grn	0	0	0	1	1	1	0	3
17-Owl Crk Black	15	92	80	50	19	2	0	258
18-C Mottled	0	0	0	22	20	7	0	49
19-C Dr Gray	0	0	0	14	7	1	0	22
22-C Mott/Flecks	0	0	0	0	2	7	0	9
23-C Mott/Banded	0	0	0	5	3	1	1	10
28-Table Rock Flat	0	0	0	0	2	0	0	2
Subtotal	*50*	*571*	*462*	*466*	*221*	*74*	*1*	*1845*
Unidentified Types								
Indet Black	20	95	33	22	6	2	0	178
Indet Dk Brown	24	257	141	52	16	2	0	492
Indet Dk Gray	22	123	93	79	11	3	0	331
Indet Lt Brown	82	248	107	151	23	6	0	617
Indet Lt Gray	15	97	107	73	34	11	0	337
Indet Misc.	20	137	93	82	34	2	0	368
Indet Mottled	0	0	5	13	30	5	0	53
Indet Trans	6	6	11	15	3	0	0	41
Indet White	2	35	26	26	4	0	0	93
Subtotal	*191*	*998*	*616*	*513*	*161*	*31*	*0*	*2510*
Obsidian	1	0	0	0	0	0	0	1
Total	**242**	**1569**	**1078**	**979**	**382**	**105**	**1**	**4356**

distance trade on the Great Plains and represents the import of an exotic raw material to an area where raw material was probably the chief export. This flake was submitted to Dr. Thomas Hester, Texas Archeological Research Laboratory, who in turn submitted it to the Lawrence Livermore Laboratory in Berkeley, California, for X-ray florescence sourcing analysis. The results of this test indicate that the obsidian flake is associated with the Malad source in southeastern Idaho. Although the age of the F 1 midden is not well established, the recovery of at least one arrow

Table 6.34 Binomial Statistic Results, AU 1, 41CV137.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
01-HL Blue(l)	1	214	274	less	89	129	less
02-C White	5	214	274	less	89	129	less
03-AM Gray	10	214	274	less	89	129	less
06-HL Tan	325	214	274	more	89	129	more
07-Foss Pale Brown	8	214	274	less	89	129	less
08-FH Yellow	1120	214	274	more	89	129	more
09-HL Tr Brown	9	214	274	less	89	129	less
13-ER Flecked	3	214	274	less	89	129	less
14-FH Gray	11	214	274	less	89	129	less
15-Gry/Brn/Grn	2	214	274	less	89	129	less
17-Owl Crk Black	258	214	274	expected	89	129	more
18-C Mottled	49	214	274	less	89	129	less
19-C Dr Gray	22	214	274	less	89	129	less
22-C Mott/Flecks	9	214	274	less	89	129	less
23-C Mott/Banded	10	214	274	less	89	129	less
28-Table Rock Flat	2	214	274	less	89	129	less
Obsidian	1	214	274	less	89	129	less
Total Indet	2510	214	274	more	na	na	na

point from the matrix indicates that the midden contains a Late Prehistoric component. This is consistent with the age of other Malad obsidian artifacts, which are common in Late Prehistoric sites along the Balcones escarpment and indicate the existence of well-established trade routes between the southern and northern Plains (Hester et al. 1991; Turner and Hester 1993).

As is the case with most of the thick toeslope middens examined, the trenches and test pits yielded a relatively rich, diverse faunal record (Table 6.36). Recovered taxa are dominated by unidentifiable fragments of deer-sized mammals, with deer and unidentified artiodactyl elements comprising the next most common fragments. However, some elements representing bos/bison (probably bison) were also recovered, indicating that deer were not the only large game taken by the inhabitants. Smaller animals occur in relatively low numbers, and in some cases may represent intrusive species. These additional taxa include jackrabbit, unidentified rodent, raccoon, cottontail rabbit, and turtle. Only two mussel shell valves were recovered, indicating that the relatively great distance to a perennial stream probably restricted the exploitation of aquatic resources.

6.3.3 Conclusions and Recommendations

This site is situated at the mouth of a small upland tributary as it emerges from its Manning surface canyon onto the Killeen surface. It consists of a thick, heavily vandalized midden deposit that extends from the tributary terrace up a fairly steep slope. The shallow modern channel belies the thickness of Holocene-age deposits detected in the trenches and test pits. This midden deposit was transected by BT 1, while BTs 2 and 3 were excavated a few tens of meters downstream.

The age of the fills represented is unclear. One radiocarbon age and artifact recovery from the lower occupation in BT 1 suggests that it

represents the lower West Range fill, while the upper deposits may also be of West Range age, although the presence of Late Prehistoric cultural material suggests that some of the sediments may be of Ford age. Most of the deposits exposed in BT 2 appear to also be late Holocene in age, but a wedge of alluvial/colluvial material at the base of the trench may represent an older Holocene fill. The strong carbonate development in the body of the fill exposed in BT 3 strongly suggests that it is of late Pleistocene age, while the wedge of alluvium that caps the truncated fill is clearly Holocene. Although moderate amounts of incorporated colluvium are present, sedimentation in the narrow valley (exclusive of the cultural deposits of F 1) appears to have been dominantly driven by alluvial processes during all periods.

Most of the cultural material, and all that was in demonstrably good context, was detected in BT 1 and its associated test pits. On the slope, the midden is heavily and intentionally disturbed and has relatively little remaining integrity. The thick midden deposit on the terrace is also clearly disturbed, but the extent of vandalism in this portion of the deposit is much less clear. It is probable that at least some of the upper midden is colluvially-reworked from the steep slope, and it is possible that most of the terrace midden actually represents redeposited backdirt from vandal pits on the slope. Historic trash contained in the deposit indicates disturbance to depths of more than 50 cm, suggesting that either in situ pits are present or most of the overthickened feature on the terrace is reworked from the slope.

No vandal pits were evident in the profile or on the terrace surface. Rather, as is typical of many of the black toeslope middens on Fort Hood, the character of the matrix makes identification of disturbance extremely difficult. Initially, the smooth surface topography, internal organization of the matrix, moderate retention of soil structure, and uniform transition into the underlying zone led the geomorphologist (Abbott) to conclude that much of the deposit was in relatively pristine context. However, the friable nature of the deposit and the presence of some historic trash in the matrix subsequently led the archeological crew chief (Kleinbach) to conclude that most, if not all, of the upper midden was disturbed. At present, these two

Table 6.35 Debitage Cortex Characteristics by Material Type, AU 1, 41CV137.

Lithic Material	Partial Cortex: Abraded	Partial Cortex: Unabraded	Partial Cortex: Indeterminate	no cortex	indeterminate	Total
Identified Types						
01-HL Blue(l)	1	0	0	0	0	1
02-C White	0	0	0	5	0	5
03-AM Gray	0	0	0	10	0	10
06-HL Tan	14	5	3	302	1	325
07-Foss Pale Brown	1	0	0	7	0	8
08-FH Yellow	29	13	4	1074	0	1120
09-HL Tr Brown	1	0	2	6	0	9
13-ER Flecked	0	0	0	3	0	3
14-FH Gray	0	0	0	11	0	11
15-Gry/Brn/Grn	1	0	0	2	0	3
17-Owl Crk Black	3	4	0	251	0	258
18-C Mottled	5	0	0	44	0	49
19-C Dr Gray	0	1	0	21	0	22
22-C Mott/Flecks	4	0	0	5	0	9
23-C Mott/Banded	1	1	0	8	0	10
28-Table Rock Flat	0	0	2	0	0	2
Subtotal	*60*	*24*	*11*	*1749*	*1*	*1845*
Unidentified Types						
Indet Black	0	1	2	175	0	178
Indet Dk Brown	5	4	3	480	0	492
Indet Dk Gray	7	4	5	315	0	331
Indet Lt Brown	18	6	12	578	3	617
Indet Lt Gray	4	5	0	328	0	337
Indet Misc.	18	14	6	300	30	368
Indet Mottled	17	9	7	20	0	53
Indet Trans	0	0	0	41	0	41
Indet White	2	2	0	89	0	93
Subtotal	*71*	*45*	*35*	*2326*	*33*	*2510*
Obsidian	0	0	0	1	0	1
Total	**131**	**69**	**46**	**4076**	**34**	**4356**

Table 6.36 Faunal Recovery, AU 1, 41CV137.

	Element																																
Vertebrates	Antler	Astragalus	Calcaneus	Caudal Vertebra	Cranium	Distal phalange	Fused 2&3rd carpal	Fused 3&4th carpal	Fused 3&4th metata	Humerus	Indeterminate	Long bone	Mandible	Metapodial	Middle phalange	Pelvis	Peripheral	Permanent tooth	Plastron	Pleural	Proximal Phalange	Radius	Rib	Scapula	Carapace	Thoracic vertebra	Tibia	Tooth	Ulna	Vertebra	left	right	Total
Artiodactyla	0	1	0	0	1	0	1	2	12	2	1	0	1	4	1	0	0	0	0	0	2	0	0	0	0	1	3	0	1	2	0	0	35
Bos/Bison	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	6	0	0	0	0	11
Lepuis californicus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Mammalia (lg/vlg)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mammalia (med/lg)	0	0	0	1	0	0	0	0	0	0	483	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	486
Mammalia (mediu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Mammalia (very lg)	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Odocoileus sp.	2	0	1	0	0	2	0	0	0	1	0	0	1	0	0	0	0	5	0	0	0	3	0	1	0	0	2	0	0	0	0	0	18
Procyon lotor	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Rodentia (medium)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
Sylvilagus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Testudinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	13	0	0	0	0	0	0	0	16
Vertebrata	0	0	0	0	0	0	0	0	0	0	68	4	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	77
Total	**2**	**1**	**1**	**1**	**1**	**2**	**1**	**2**	**13**	**5**	**556**	**5**	**2**	**4**	**1**	**1**	**1**	**8**	**1**	**1**	**2**	**4**	**1**	**3**	**18**	**1**	**8**	**6**	**1**	**2**	**0**	**0**	**655**
Bivalves																																	
Ambleminae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Lampsilis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**2**

views have not been reconciled, and we are unable to confidently assess the degree of contextual integrity of the upper deposit, although the hodge-podge of projectile points from F 1 supports the possibility of disturbance.

However, a second occupation with clear contextual integrity is preserved at depth in the terrace segment of BT 1. This deposit is associated with a buried alluvial fill and contains relatively dense cultural material. Burned rock is also dispersed throughout the sediment below this occupation, and the possibility remains that additional, less intense occupations are present at depth. These deposits have high archeological potential as sources of data with which to address issues outlined in the research design for Fort Hood (Ellis et al. 1994).

On the basis of the above, we judge 41CV137 to be significant and eligible for inclusion in the NRHP by virtue of containing cultural and environmental data that can contribute substantially to the current state of prehistory development for Central Texas in general, and the Fort Hood area in particular. We therefore recommend that the site be avoided and protected to prevent the loss of significant scientific information. Because known significant deposits revealed in BT 1 occur directly below a jeep trail, the site requires measures to protect it against: (1) traffic by tracked and wheeled vehicles, (2) subsurface disturbance by vandalism, and (3) subsurface disturbance by mechanical and manual excavations performed by military personnel during training activities.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery should include at least one backhoe trench and manual excavation of a block up to 80 m^2 in area on the T_1 terrace around BT 1. Block excavation should examine both defined components, but concentrate on exposing buried features and living surfaces associated with the lower occupation. Given an average depth of 170 cm, block excavations could reach a total volume of approximately 136 m^2 of manual excavation. However, should the upper deposits prove to be extensively disturbed throughout, they should be removed as overburden. One backhoe trench should be excavated on the margin of the block prior to excavation to provide exposures for geoarcheological studies of landscape processes and facilitate stratigraphic correlation.

6.4 SITE 41CV164

6.4.1 Introduction

In September 1993, Mariah conducted test excavations at site 41CV164. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.4.1.1 Location and Description

Site 41CV164 is located on the north side of Table Rock Creek. Table Rock Creek and a tributary delimit the southern and eastern site boundaries, respectively (Figure 6.30). The site's dimensions are approximately 390 x 100 m (about 39,000 m^2, or 9.6 acres). The site contains a Pleistocene terrace that comprises about two-thirds of the surface and a Holocene terrace with deposits at least 2 m thick (Figure 6.31). For purposes of this report, the site is considered part of the Table Rock site group.

6.4.1.2 Previous Work

Vinson and Thomas first recorded the site 4 March 1979. The site was recorded as a lithic scatter

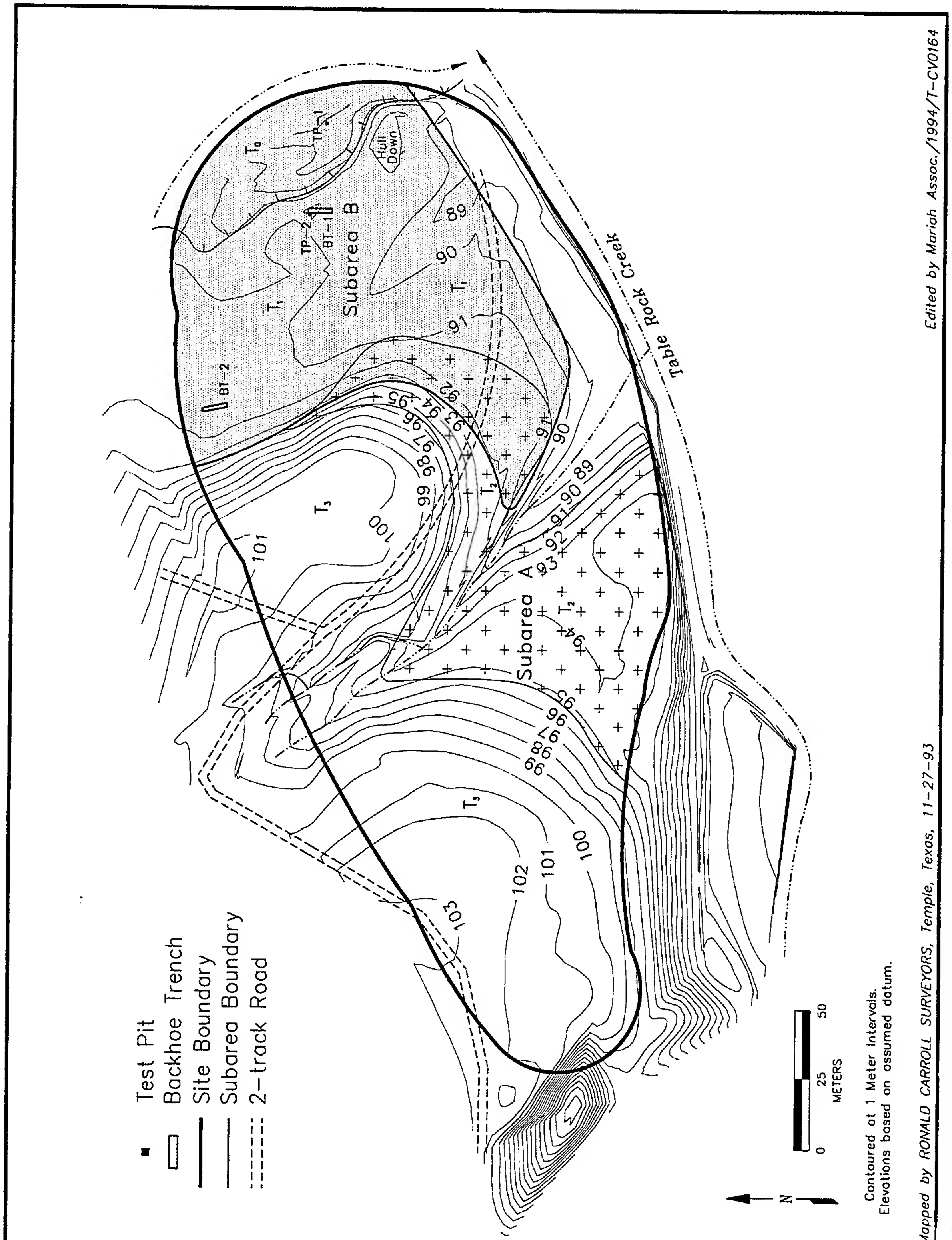

Figure 6.30 Site Map of 41CV164.

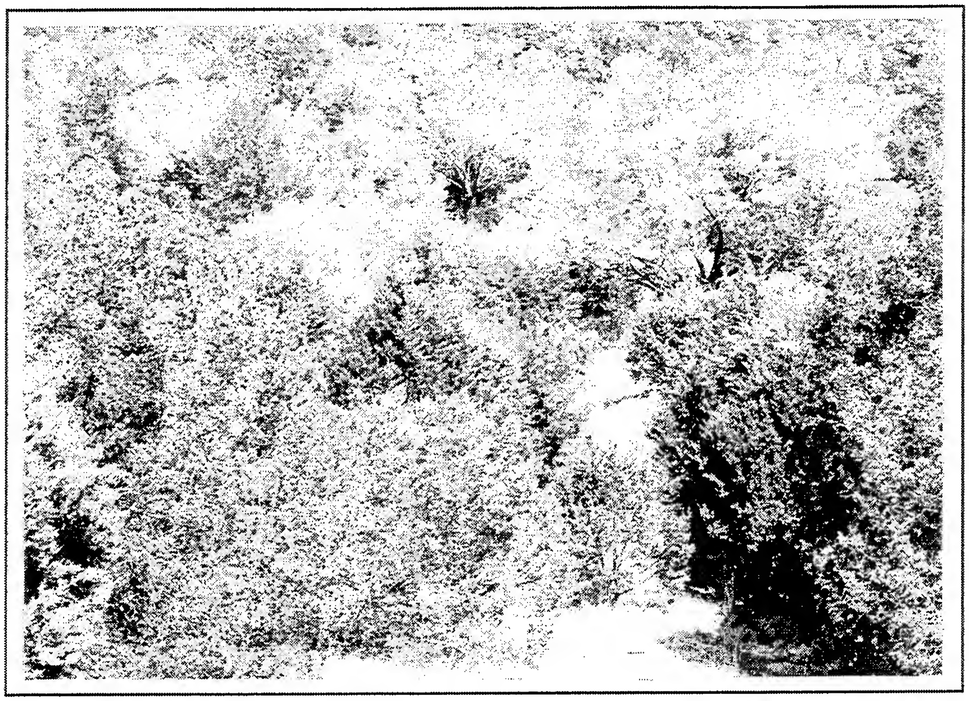

Figure 6.31 Overview of Site 41CV164, Looking North.

extending from the north bank of Table Rock Creek and bounded by a seasonal spring flowing east to southeast to the creek. The site was located on an escarpment which overlooked Table Rock Creek and its valley. Flakes and bifaces were noted across the surface, with vehicles impacting an estimated 50% of the site. Estimated depth of deposit was no more than 10 cm.

Moore and Strychalski monitored the site 21 November 1985 and conducted a boundary check to determine if the site extended into a specific quad. A chert field was noted, and nothing else was found to suggest the site extended into this quad. However, a quadline could not be drawn on the original site map since "it was not accurate when compared to the blueline, orthopicto map, and UTMs."

Dureka, Peterson, and Kirkland remonitored the site 20 January 1988. An extensive scatter of burned rocks and lithics (including a dart point) were observed and a limonite outcrop was noted along the scarp edge. The report from this visit included the statement that "We can scarcely believe FY84MON visited this area; there is very little chert here, much less a chert field." Vehicles and erosion had impacted an estimated 60% of the site, and it was determined that formal recording, erosion control, and mitigation should occur. A new site map was drawn showing the 1988 site location and its 1979 IGAS plot. This map showed the 1988 location to be about 100 m east of original location.

On 25 March 1992, Quigg and Frederick revisited and reevaluated the site based on archeological and geomorphological observations, with both aforementioned site plots (1979 and 1988) taken into consideration. The site was divided into Subareas A and B. A thin lithic and burned rock scatter was noted on the Pleistocene terrace (Subarea A). A large portion of this terrace had undergone extensive sheet erosion. Two dart points were collected. No further management was recommended for Subarea A. Subarea B, the east

end of the site consisting of Holocene alluvium, warranted testing. While no cultural material was observed here, the potential existed for buried cultural deposits. A crew returned on 13 April 1992 and excavated three shovel tests. All were dug to 40 cmbs, with only one positive test (a burned rock in the upper 10 cm). This suggested that some material may be shallowly buried, but the deposits below 40 cm remained unexplored. Formal testing, consisting of at least two backhoe trenches and two manually excavated 1 x 1 m test pits, was recommended to determine NRHP eligibility (Trierweiler 1994:A767-A771).

6.4.1.3 New Work

Two backhoe trenches were dug on the T_1 terrace in Subarea B (Table 6.37). Trench 1 was placed near the northeast corner of Subarea B and 20 to 30 m west of the tributary that delimits the eastern site boundary. Trench 2 was placed 40 to 50 m northwest of BT 1 and approximately 10 m east of the base of the Pleistocene terrace (Subarea A). No artifacts were observed in either trench. Although the tributary T_0 could not be accessed with the backhoe, Frederick and Kleinbach reinspected the tributary cutbank for material. Three animal bones, including one mandible, were observed and identified as bison. This T_0 terrace wedge is the only portion of the subarea where potentially relevant cultural material was found.

Two 1 x 1 m test pits (TP 1 and TP 2) were excavated for a total of 2.4 m^2 of manual excavations. Test pit 1 was offset from the south bank of the tributary's T_0 terrace where the bones were visible in the cutbank. Prior to excavation, a profile was drawn and photographs of the bones were taken. The profile consisted of a 2 m section which included TP 1 and a 1 m extension to the east. A mandible was collected from the cutbank at about 68 cmbs. Test pit 2 was offset from the south wall of BT 1 on the T_1 terrace and excavated to 140 cmbs. Recovered material is summarized in Table 6.38.

Table 6.37 List of Treatment Units, 41CV164.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	6.7	0.7	200
1	BT 2	8.3	0.7	215
1	TP 1	1.0	1.0	100
1	TP 2	1.0	1.0	140

6.4.2 Results

One trench, BT 1, was placed on the edge of the T_1 surface overlooking an incised tributary valley. The soil seen in the alluvium exhibited an A-ABkss-Bkss profile formed in clayey alluvium. The calcic horizon exhibited a few (about 1%) small (1 to 3 mm diameter) calcium carbonate segregations forming between ped faces. This degree of development suggests a considerable developmental period, and the fill was interpreted as the Fort Hood fill of Nordt (1992). Although a few snail fragments were observed in the upper 80 cm of deposits, no cultural material was found from 0 to 140 cmbs in TP 2, which was offset from the wall of BT 1 on the T_1 terrace. The second trench, BT 2, was placed at the toe of a limestone slope at the edge of the valley margin. This trench exposed a colluvial facies of the same fill as BT 1 which exhibited an A-Bw-Bk-C profile formed in slightly gravelly, fine-grained alluvium.

No trenches were placed on the single constructional surface in the incised tributary valley due to accessibility limitations imposed by the steep terrace scarp and dense trees. The fill beneath this surface was not described, but it appeared to be consistent with the Ford fill of Nordt (1992). Test pit 1 was placed on the cutbank of the T_0 terrace, inset over the exposed bone. Other than snails and charcoal, bison bone (both definitively identified and inferred due to association) were the only items recovered from TP 1. Bones found from 73 to 81 cmbs included a cervical vertebra, isolated teeth, probable skull fragments, and a mandible (Table 6.39). None of

Table 6.38 Artifact Recovery by Test Pit, 41CV164.

	TEST PIT 1					TEST PIT 2				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	0	0	0(0)	0	0	0	0	0(0)
2	0	0	0	0	0(0)	0	0	0	0	0(0)
3	0	0	0	0	0(0)	0	0	0	0	0(0)
4	0	0	0	0	0(0)	0	0	0	0	0(0)
5	0	0	0	0	0(0)	0	0	0	0	0(0)
6	0	4	0	0	0(0)	0	0	0	0	0(0)
7	0	19	0	0	0(0)	0	0	0	0	0(0)
8	0	27	0	0	0(0)	0	0	0	0	0(0)
9	0	0	0	0	0(0)	0	0	0	0	0(0)
10	0	0	0	0	0(0)	0	0	0	0	0(0)
11						0	0	0	0	0(0)
12						0	0	0	0	0(0)
13						0	0	0	0	0(0)
14						0	0	0	0	0(0)
TOTAL	0	50	0	0	0(0)	0	0	0	0	0(0)

these bones, including the mandible collected from the tributary bank, exhibited cut marks or burning, and only one (2%) exhibited a spiral fracture. This observation, coupled with the absence of associated cultural material, suggests that the remains represent a natural occurrence rather than human activities. Nevertheless, an AMS radiocarbon age was obtained from charcoal fragments above the bone to extend knowledge of the timing of bison occurrence on the southern plains (cf. Dillehay 1974). This age, obtained from TP 1, Level 5, is 410 ± 80 BP (Beta b-73192), which is consistent with the latter part of Dillehay's Bison Presence Period III (1994:184).

6.4.3 Conclusions and Recommendations

Two trenches were excavated into the T_1 surface of Table Rock Creek on the southeast side of this site in order to prospect for buried cultural deposits and to evaluate the alluvial stratigraphic units present. Neither of these trenches uncovered evidence of buried cultural material and both exposed the same alluvial fill, which is interpreted as the Fort Hood alluvium of Nordt (1992).

Table 6.39 Faunal Recovery, AU 1, 41CV164.

	Element					
Vertebrates	Cervical Vertebr	Indeterminate	Mandible	Permanent tooth	Tooth	Total
Bos/Bison	0	0	2	17	0	19
cf. Bison bison	1	0	0	0	0	1
Mammalia (lg/vlg)	0	7	0	0	7	14
Mammalia (med/lg)	0	6	0	0	0	6
Vertebrata	0	17	0	0	0	17
Total	**1**	**30**	**2**	**17**	**7**	**57**

Bison bone was recovered from an inset of Ford alluvium in the tributary valley. A radiocarbon age from immediately above this bone suggests that the animal died slightly over 400 years ago and was incorporated into Ford alluvium aggrading in the incised tributary valley. No cultural material was discovered in association with this bone, which appears to represent natural mortality rather than any cultural activity.

Cultural materials in Subarea A (the Pleistocene terrace) lack contextual integrity and, therefore, have extremely limited significance with respect to advancing research at Fort Hood according to the research design for (Ellis et al. 1994). Subarea B does not appear to contain cultural deposits, and the bison remains located at the site appear to be a natural occurrence. As a result, the site does not contain any data which would bear on research design issues.

On the basis of the above, we judge site 41CV164 to be ineligible for inclusion in the NRHP, and we recommend no further management for the site.

6.5 SITE 41CV174

6.5.1 Introduction

In late September and October 1993, Mariah conducted test excavations at site 41CV174. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.5.1.1 Location and Description

Site 41CV174 is located in the Table Rock area of Fort Hood. The site extends across two distinct alluvial terraces (T_{1A} and T_{1B}) of Table Rock Creek to colluvial toeslopes at the base of the valley slopes (Figure 6.32). A very large burned rock midden covers portions of the upper terrace and colluvial toeslope. An unnamed tributary drains into Table Rock Creek at the northwestern corner of the site, and the southeastern portion of the site is defined by another unnamed tributary. A tank trail passes adjacent to the northwestern boundary. Maximum site dimensions are 350 x 150 m (about 52,000 m^2, or 13 acres). For purposes of this report, the site is considered part of the Table Rock site group.

6.5.1.2 Previous Work

This site was initially recorded by Thomas and White on 13 March 1979 as an extremely vandalized burned rock midden. A high density of burned rock, mussel shell, and snail shell, and a low density of debitage, bifaces, and bone were observed. Based on exposures in vandal excavations, the site was noted as containing more than a meter of alluvium. The site was estimated to be 50 to 75% disturbed by vandalism.

Moore and Bradle monitored the site on 27 October 1985. The same types of cultural material were observed as during the initial survey and a dart point was collected. Although increased vandalism was noted, only 40% of the site was estimated to be disturbed. Recommendations to protect the site were noted, and the boundary was expanded.

Abbott, Lintz, and Oglesby revisited the site in January 1992 and evaluated the site based on archeological and geomorphic observations. The site was divided into Subarea A (the lower T_{1B} terrace) and Subarea B (the higher T_{1B} terrace, which included the vandalized midden). Because both subareas had the potential to contain intact cultural deposits, a crew returned and excavated seven shovel tests in Subarea A and six shovel tests in Subarea B. While only one of the shovel tests within Subarea A contained cultural material, the majority of shovel tests within Subarea B yielded cultural items to a depth of 40 cmbs, suggesting that Subarea B contained potentially intact cultural material. On the basis of this work, the NRHP eligibility of this area was nevertheless uncertain and the site was recommended for avoidance or formal testing if avoidance was not

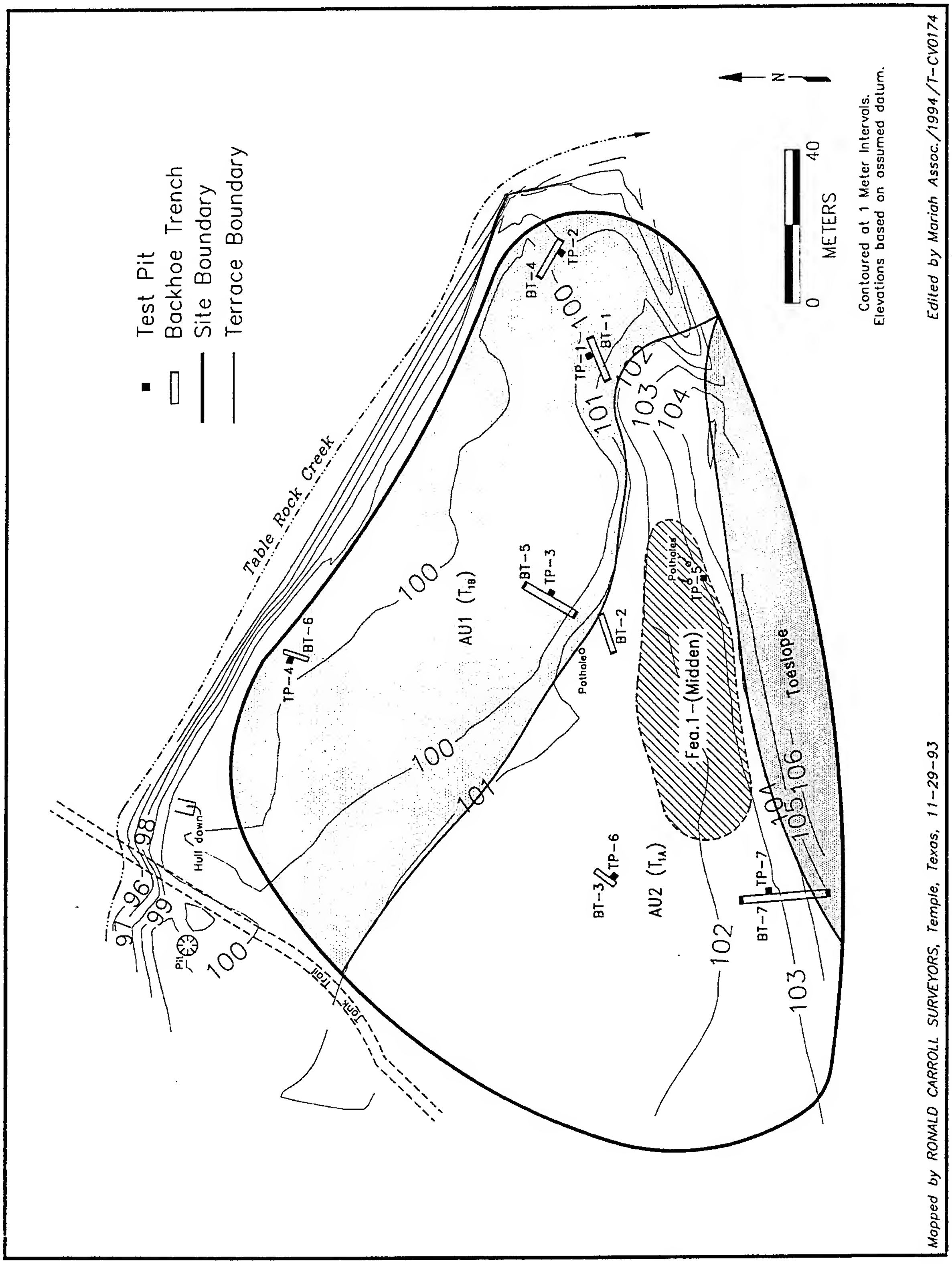

Figure 6.32 Site Map of 41CV174.

possible. Four to six 1 x 1 m manually excavated test pits and three to four backhoe trenches were recommended to clearly determine eligibility (Trierweiler 1994:A772-A775).

6.5.1.3 New Work

Both subareas of the site (A and B) were tested, using a total of seven backhoe trenches and seven manually excavated test pits (Table 6.40). Although the 1992 work concluded that Subarea A did not contain intact deposits, further inspection clearly determined that several meters of Holocene alluvium were present in this portion of the site. Four trenches (BTs 1, 4, 5, and 6) were placed on the lower surface (Subarea A). A 1 m^2 test pit (TPs 1, 2, 3, and 4) was offset from each of these trenches. Three trenches (BTs 2, 3, and 7) were excavated into the upper surface (Subarea B). Two 1 m^2 test pits (TPs 6 and TP 7) were offset from BTs 3 and 7, respectively. Trench 2 was excavated into the extensive burned rock midden (F 1). A 1.5 x 0.5 m test pit (TP 5) was placed as an isolated unit on F 1. Recovered cultural material is summarized in Table 6.41. To facilitate analysis, the site was divided into two analytical units consisting of the lower terrace (AU 1) and the upper terrace (AU 2).

Table 6.40 List of Treatment Units, 41CV174.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	12	0.8	335
1	BT 4	8	0.8	240
1	BT 5	15	0.8	285
1	BT 6	8	1.5	260
1	TP 1	1.0	1.0	400
1	TP 2	1.0	1.0	180
1	TP 3	1.0	1.0	180
1	TP 4	1.0	1.0	70
2	BT 2	15	0.8	210
2	BT 3	8	1.5	210
2	BT 7	25	0.8	230
2	TP 5	1.5	0.5	130
2	TP 6	1.0	1.0	80
2	TP 7	1.0	1.0	140

6.5.2 Results

Seven trenches were excavated within the site boundaries in order to evaluate the stratigraphic setting and to prospect for deeply buried cultural components. Two constructional geomorphic surfaces (lower and upper terraces) are present on this site and are separated by a gentle swale across the western two-thirds of the site.

6.5.2.1 Excavations in the Lower Terrace Surface

The lower surface is underlain by at least two alluvial fills, presumably the Ford and West Range alluvial units of Nordt (1992). Discrimination of these fills was problematic on the basis of field criteria.

Trench 1 was started on the scarp separating the two surfaces at the eastern end of the site and dragged down onto the lower surface. In BT 1, at least two alluvial fills were exposed, and the unconformity between them was clearly expressed at the southern end of the trench (Figure 6.33). The majority of the sediments in this location are medial to distal overbank sediments and exhibited 10YR hues. An A-ABk-Bk-BC soil profile was observed in these deposits. The color, degree of soil development, and stratigraphic position suggest that this fill correlates with Nordt's West Range alluvium, although the upper portion of the profile may also include some sediments affiliated with a later fill, such as the Ford alluvium. The older fill at the upslope end of the trench is rubified and exhibited 7.5 YR hues. It is assumed to correlate with the Fort Hood alluvium. The texture and slope position of this deposit are consistent with a colluvial/alluvial facies.

Several lenses of scattered burned rock were observed in the walls of BT 1. A small hearth was exposed in the south wall at 135 to 150 cmbs, and

Table 6.41 Artifact Recovery by Test Pit, 41CV174.

	TEST PIT 1					TEST PIT 2					TEST PIT 3				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	0	0	2(0.1)	0	7	18	2	15(1)	0	0	0	0	1(0.3)
2	0	0	0	0	1(0.3)	0	10	53	3	14(1.5)	0	3	7	0	6(1)
3	0	0	0	0	0(0)	1	5	11	0	25(2.5)	0	1	3	0	3(0.3)
4	0	0	1	0	2(0.5)	0	17	13	1	25(2)	0	8	1	0	2(0.2)
5	1	6	14	0	20(1.5)	3	6	4	0	10(0.5)	0	2	9	0	3(1)
6	3	38	56	1	48(2)	0	0	2	0	6(0.5)	0	0	1	0	0(0)
7	3	18	34	3	40(2)	0	0	0	0	1(0.1)	0	0	0	0	0(0)
8	1	6	20	1	20(1.5)	0	0	0	0	0(0)	0	2	1	0	1(0.1)
9	0	42	32	2	50(3)	0	0	0	0	0(0)	0	0	0	0	0(0)
10	0	25	34	4	52(2)	0	0	0	0	3(0.3)	0	1	0	0	0(0)
11	0	24	29	0	15(1.3)	0	0	0	0	1(0.1)	0	0	0	0	1(0.3)
12	0	2	4	1	13(0)	0	0	0	0	5(0.5)	0	0	0	0	0(0)
13	0	10	2	0	26(2)	0	0	0	0	18(4)	0	0	0	0	0(0)
14	0	32	6	3	45(3)	0	0	0	0	0(0)	0	0	0	0	0(0)
15	0	4	1	0	32(14)	0	0	0	0	122(42)	0	6	0	0	0(0)
16	0	2	0	0	3(0.5)	0	0	0	1	0(0)	0	32	0	0	0(0)
17	0	0	1	0	2(0.5)	0	0	0	0	269(89.5)	0	256	0	0	0(0)
18	0	0	0	0	9(1)	0	0	0	0	0(0)	0	0	0	0	0(0)
19	0	4	3	0	7(1)										
20	0	0	0	0	46(15)										
21	0	0	0	0	73(30)										
22	0	0	0	0	5(1)										
23	0	0	0	0	2(0.1)										
24	0	0	0	0	4(0.1)										
25	0	0	0	0	0(0)										
26	0	0	0	0	13(3)										
27	0	0	1	0	0(0)										
28	0	0	2	0	1(0.1)										
29	0	0	0	0	0(0)										
30	0	0	0	0	1(0.1)										
31	0	0	0	0	0(0)										
32	0	0	0	0	8(1)										
33	0	0	0	0	0(0)										
34	0	0	0	0	1(0.1)										
35	0	0	0	0	1(0.1)										
36	0	0	0	0	0(0)										
37	0	0	0	0	0(0)										
38	0	0	0	0	0(0)										
39	0	0	0	0	1(0 1)										
40	0	0	0	0	1(0.1)										
TOTAL	8	213	240	15	544(87)	4	45	101	7	391(144.5)	0	311	22	0	16(2.9)

	TEST PIT 4					TEST PIT 5					TEST PIT 6					TEST PIT 7				
LEVEL	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	0	0	0(0)	0	1	0	0	6(1.5)	0	0	2	0	3(0.3)	0	0	0	0	2(0.3)
2	0	0	0	0	0(0)	0	1	0	0	8(2)	0	0	8	0	0(0)	0	0	0	0	0(0)
3	0	0	0	0	0(0)	0	0	2	0	12(3)	0	0	6	0	3(0.3)	0	0	3	0	4(0.3)
4	0	0	0	0	0(0)	0	1	1	1	120(19)	0	0	2	0	2(0.3)	0	0	8	1	2(0.3)
5	0	0	0	0	0(0)	0	0	0	0	999(57)	0	0	10	0	5(0.8)	0	0	1	0	4(0.3)
6	0	0	0	0	3(1)	0	1	0	0	999(70)	0	0	7	0	45(9)	0	0	10	1	0(0)
7	0	0	0	0	2(1)	0	1	0	0	900(58)	0	0	4	1	10(1)	0	0	8	1	15(1.5)
8						0	0	7	0	750(57)	0	0	3	1	48(17)	0	0	18	1	21(4)
9						0	2	6	2	700(59)						0	0	39	2	31(6)
10						0	8	16	3	200(21)						0	2	87	5	32(9)
11						0	2	11	0	25(3)						0	1	44	3	63(12.5)
12						0	0	12	2	10(2)						0	0	10	0	280(102.5)
13						0	0	1	2	3(1)						0	0	0	0	0(0)
14																0	0	0	0	2(0.3)
TOTAL	0	0	0	0	5(2)	0	17	56	10	4732(353.5)	0	0	42	2	116(28.7)	0	3	228	14	456(137)

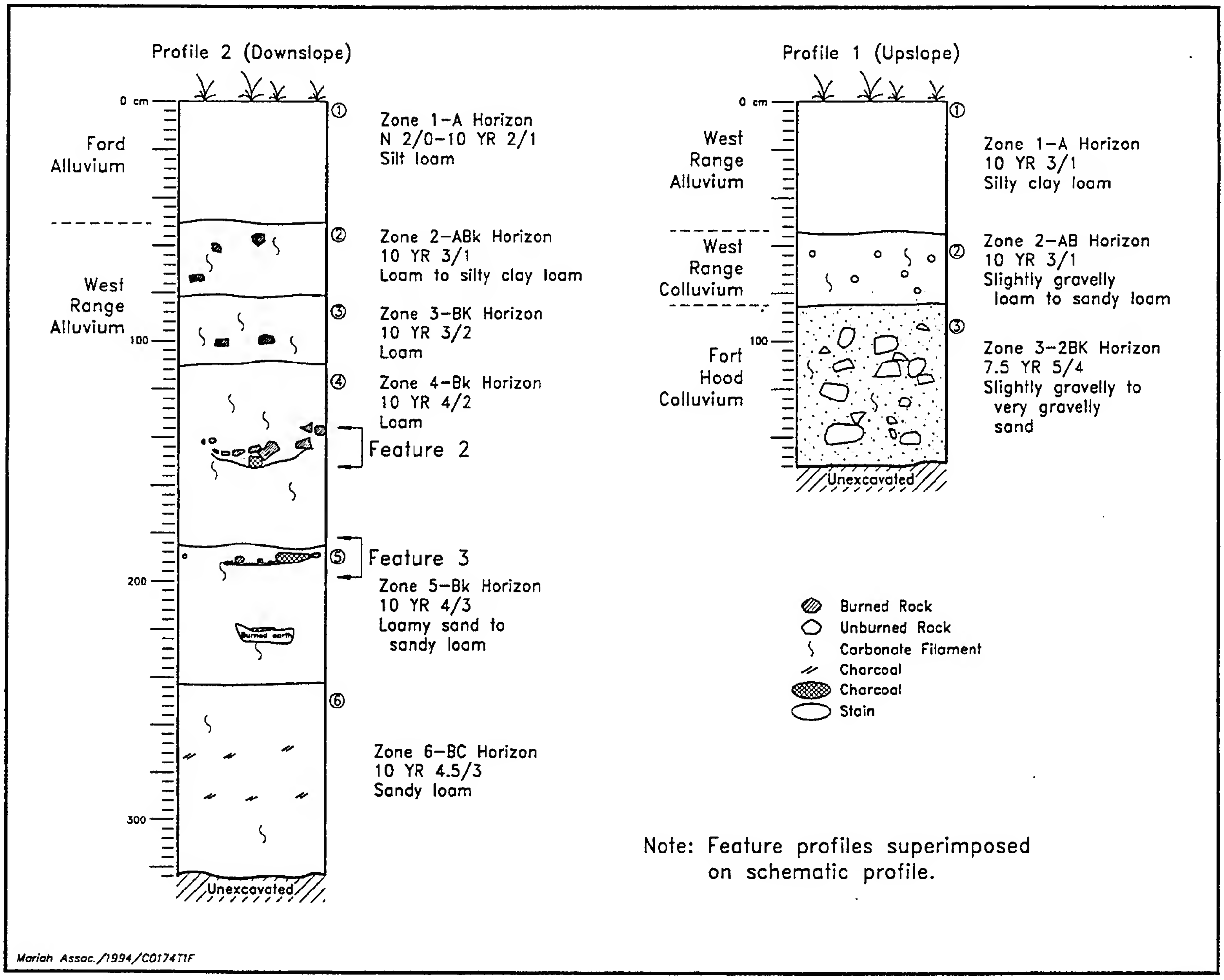

Figure 6.33 Measured Sections, BT 1, 41CV174.

a larger hearth was exposed in the north wall at 194 to 209 cmbs. The hearth exposed in the south wall (designated F 2) appeared in profile, to be a 52 cm long x 15 cm thick basin-shaped hearth and included 10 clustered angular burned rocks (less than 10 cm diameter) above a 5 cm thick charcoal lens. The northern portion of this feature was destroyed during trenching, but the remainder of the hearth appeared to be intact. A profile of the feature was sketched and a sample of charcoal was collected from the base of the feature; however, none of the material was submitted for dating.

The larger hearth in the north wall was designated F 3 (Figure 6.34). Test pit 1 was placed above F 3 and excavated to 4 mbs. In the upper levels of the pit, few artifacts were found from 0 to 40 cmbs. Within each level excavated from 40 to 130 cmbs, numerous flakes, bone fragments, and small "crumbs" of burned rock were recovered. In addition to these materials, a few mussel shell fragments were found in the majority of these levels, an Edgewood point was found at 80 to 90 cmbs, and a mottled, amorphous, orange burned area was located at the southeastern corner of the test pit from 110 to 115 cmbs. This burned area was not determined to be a feature. Most of the burned rock recovered from 40 to 130 cmbs were small fragments (less than 3 kg per level) suggesting that colluvial wash from the midden (F

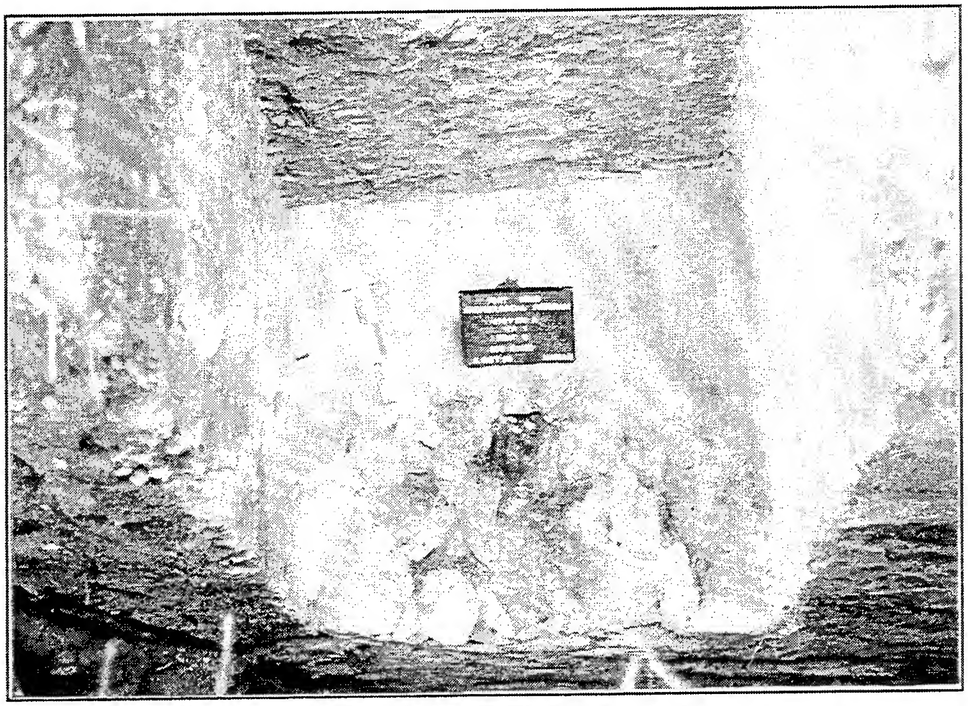

Figure 6.34 Planview of F 3, 41CV174, Looking North.

1) upslope was probably responsible for the majority of incorporated cultural material.

The top of a hearth (F 7) was encountered at 135 cmbs and the base was reached at 147 cmbs. Feature 7 consisted of an ovate, slab-lined hearth. The feature measured 52 cm long x 46 cm wide x 12 cm thick and was composed of 32 burned rocks (14 kg), of which 10 were large tabular limestone slabs that averaged about 20 cm long x 12 cm wide (Figure 6.35). The sides of the feature were defined by inward-sloping slabs and the base was defined by a single, large slab lying horizontally. At the central portion of the feature, smaller angular burned rocks were present (Figure 6.36). The integrity of this feature was excellent, with only a few small rootlets noted as a minimal disturbance. Artifacts associated with the feature included several flakes and bone fragments, charcoal chunks, an Edgewood, and an Ensor point. A radiocarbon age of 1650 ± 60 BP was obtained on charcoal collected from the fill of F 7, suggesting that it dates from the earlier part of the

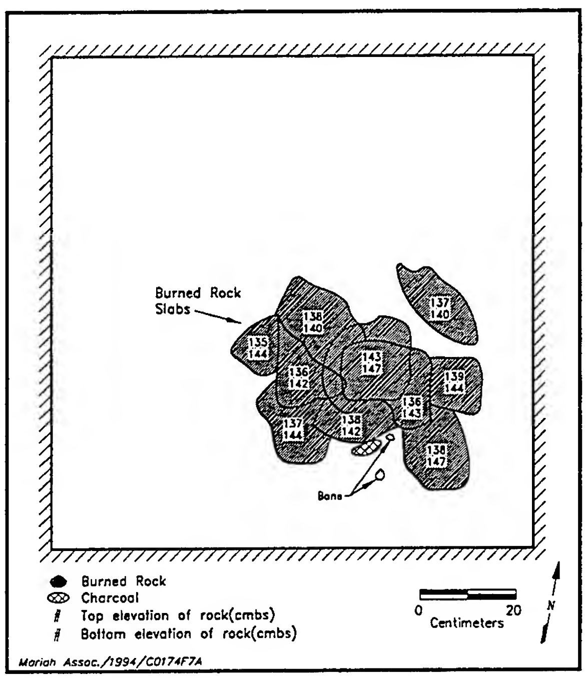

Figure 6.35 Plan of F 7 (140 cmbs), TP 1, 41CV174.

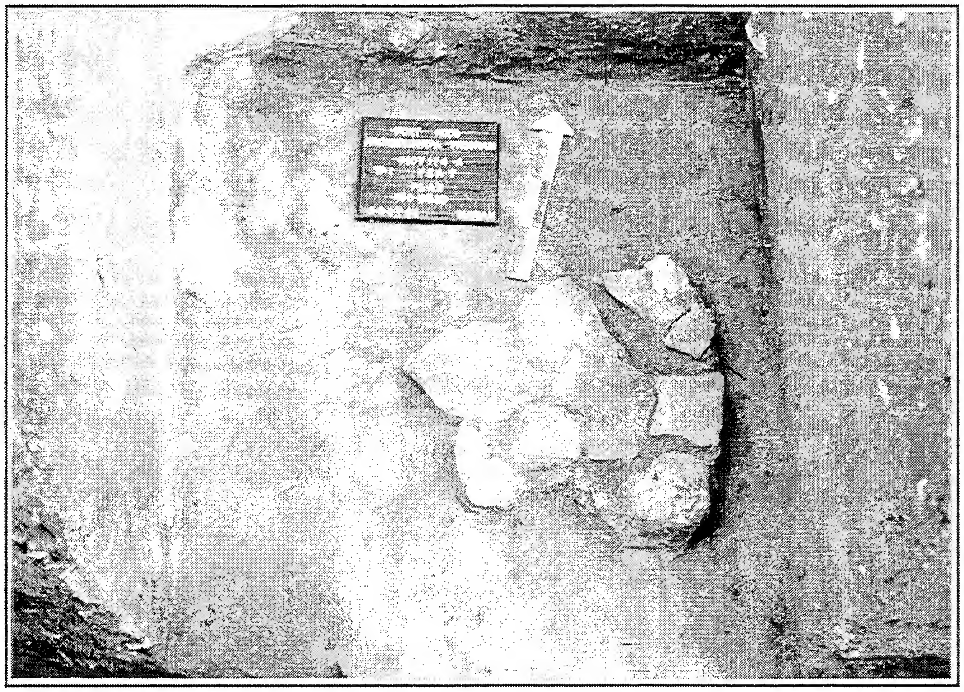

Figure 6.36 Planview of F 7, 41CV174, Looking North.

Late Archaic period and is contained in upper West Range alluvium.

Below F 7, a couple of flakes and several small burned rocks and bone fragments were found from 150 to 190 cmbs. The top of F 3, a basin-shaped hearth, was encountered at 194 cmbs (Figure 6.37). Feature 3 had been bisected by BT 1, and maximum dimensions within the unit were 89 cm long x 60 cm wide x 15 cm thick. A total of 119 burned rocks (totaling 45 kg) were recovered from the feature. The hearth was composed of three layers of tabular slabs which averaged between 10 to 15 cm in length and 5 to 10 cm in width. The outermost slabs defining the edge of the hearth tended to slant inward, with a difference in elevation of 4 to 5 cm from outermost to innermost edge. The slabs nearest the hearth center lay relatively flat. A 5 cm thick lens of charcoal was present at the lower-central portion of the hearth. Moreover, along the western edge and portions of the northern edge, a faint "rim" of oxidized soil, grossly measuring 88 cm x 10 x 3 cm, was encountered at the base of the feature at approximately 209 cmbs. Charcoal and an extremely friable, unburned long-bone fragment were the only items found in association with the hearth. A radiocarbon age of 1874 ± 87 BP (TX-8192) was obtained from the feature, indicating that it dates roughly from the transition from the Late Archaic period.

Below F 3, a few pieces of burned rock and fragments of charcoal were found from 210 to 240 cmbs. From 239 to 256 cmbs, a 25 cm wide area of burned earth and charcoal was discovered at the central portion of the test pit. The area extended across the entire length of the pit and into the north wall. This burned area had a burnt tree-trunk/root appearance and was thought to be a natural phenomenon. Levels 24 to 26, in which the burn occurred, contained several unburned and burned limestone clasts, again suggesting possible colluvial input. A burned root was present along the east wall of the pit at 276 cmbs, adding further evidence of natural burning. Levels 27 to 40

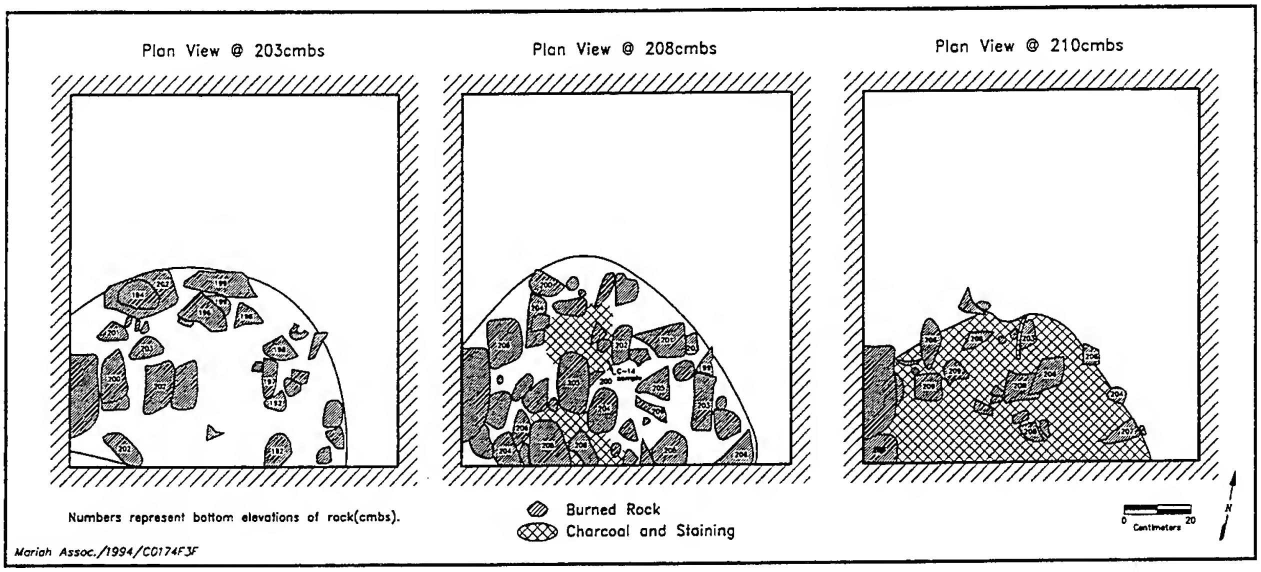

Figure 6.37 Successive Plans of F 3 at 203, 208, and 210 cmbs, TP 1, 41CV174.

contained a few flakes and a sparse amount of burned rocks, in addition to unburned rocks and gravels, in various levels.

Trench 4 was excavated on the lower alluvial terrace, about 15 m east of BT 1. The sediments exposed by this trench were somewhat sandier than BT 1, and varied from a loamy sand near the base to a loam and silty clay loam near the top of the trench. All of the deposits exhibited 10YR hues and the overall column exhibited an A-AB-Bk-BC soil profile (Figure 6.38). On the basis of soil development, the majority of the alluvium in this trench correlates with Nordt's West Range alluvium. However, diagnostic cultural material recovered from the top 40 cm of TP 2 suggests that the A and AB horizons are associated with sediment deposited during the period of aggradation of the subsequent Ford alluvium. At the eastern end of BT 4, a large burned rock feature was exposed (128 to 165 cmbs), which in profile, appeared to consist of a large slab-lined hearth resting directly on top of a larger slab-lined hearth. These two hearths were designated Fs 5 and 8, respectively. No cultural material was observed within the trench walls below these features.

Test pit 2 was placed above Fs 5 and 8 and excavated to the bottom of F 8 (175 cmbs). Within TP 2, numerous flakes, small (less than 4 cm), scattered burned rocks, small and large animal bone fragments, and a few mussel shells were recovered from 0 to 50 cmbs. In addition to these cultural materials, a Bonham point was recovered from the upper 10 cm and a Scallorn point was found from 30 to 40 cmbs. From 50 to 60 cmbs, the amount of cultural material found was drastically reduced, with only a few flakes and burned rocks recovered. Only a few burned rocks were found in various levels from 60 to 120 cmbs. From 120 to 128 cmbs, several scattered burned rocks were found above F 5.

Feature 5 consisted of a basin-shaped, slab-lined hearth and extended from 128 to 158 cmbs (Figure 6.39). Although the northern portion of F 5 was destroyed during trenching, the portion excavated within TP 2 was undisturbed and remarkably intact (Figure 6.40). The southern edge of the feature was easily defined by upright and steeply sloping burned tabular limestone rocks. These rocks extended down to a single layer of tightly placed, horizontally lying, tabular burned rocks that defined the base of the hearth. A total of 122 burned rocks (42 kg) were recovered from the

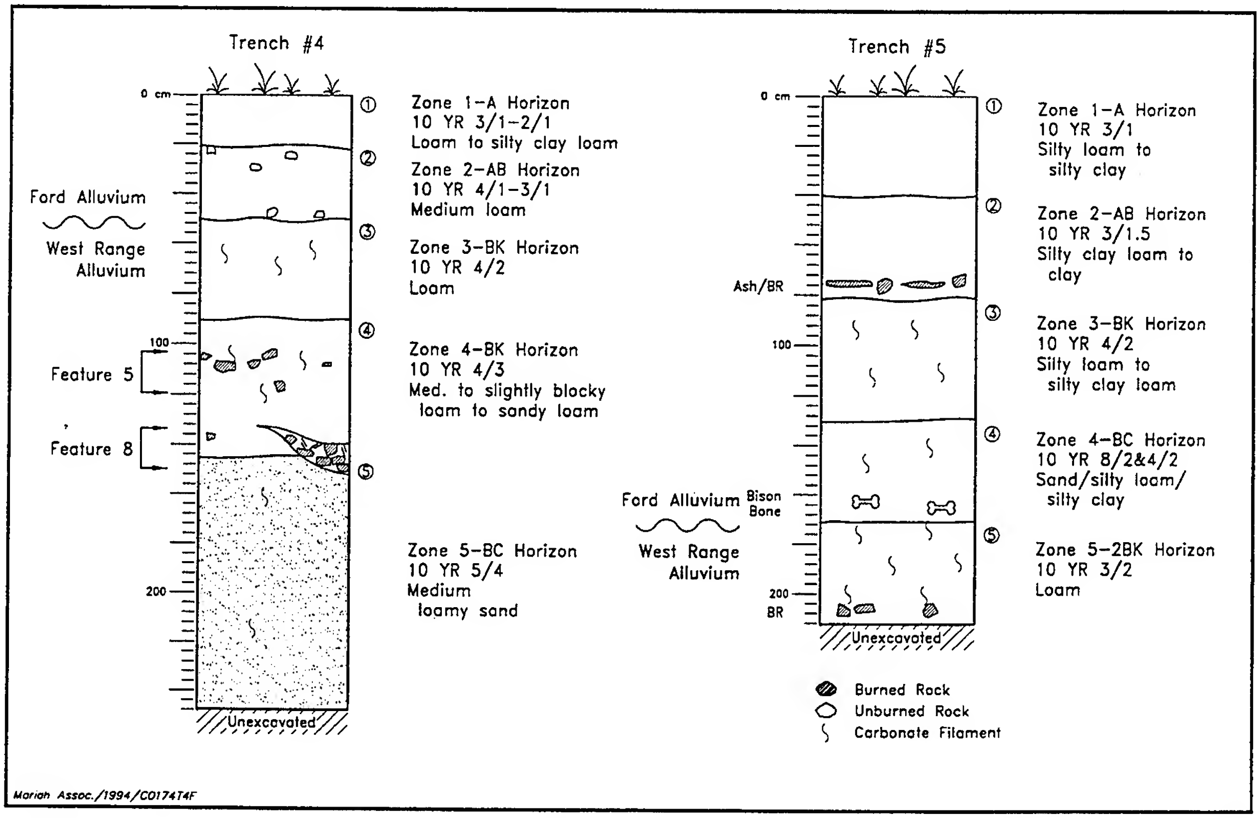

Figure 6.38 Measured Sections, BT 4 and BT 5, 41CV174.

feature within the test pit. Remaining portions of F 5 are present in the matrix adjacent to TP 2. Scattered charcoal chunks, a couple of burned mussel shells and bone fragments, and a large unifacially worked chert tool were recovered from the hearth. A radiocarbon age of 1910 ± 60 BP was obtained on charcoal from the hearth, indicating that the feature dates from the Late Archaic.

Feature 8 was encountered directly below F 5 and extended from 152 to 175 cmbs (see Figure 6.39). It consisted of a large, basin-shaped, slab-lined hearth, directly below F 5. A dense lens of charcoal, several centimeters thick, was present at the central portion of the feature and separated the basal rocks of F 5 from the top rocks of F 8. At the southern edge of the test pit, a few upright and steeply sloping burned tabular limestone rocks were exposed. These rocks may have been the edge of yet another superimposed hearth, but the delineation was not nearly as clear as that of F 5. Therefore, all of the rock located from 152 to 175 cmbs was considered to be part of F 8. Feature 8 was composed of a total of 269 burned rocks weighing a total of approximately 90 kg. The edges of the feature were defined by inward-sloping slabs and the base of the feature was defined by tightly placed, tabular burned slabs, the largest of which measured 30 cm long x 30 cm wide (5 kg). Smaller angular burned rocks were present at the central portion of the feature and oxidized soil was present throughout the feature. Only one bone fragment, found at 170 to 175 cmbs, was found within the feature fill. However, macrobotanical recovery was somewhat better. Wood charcoal and two organic fragments were recovered from F 8 and submitted to Dr. Phil Dering, Texas A&M University for identification. The wood was identified as live oak, which probably represents a fuel for the feature, while the organic remains were identified as bulbs from an

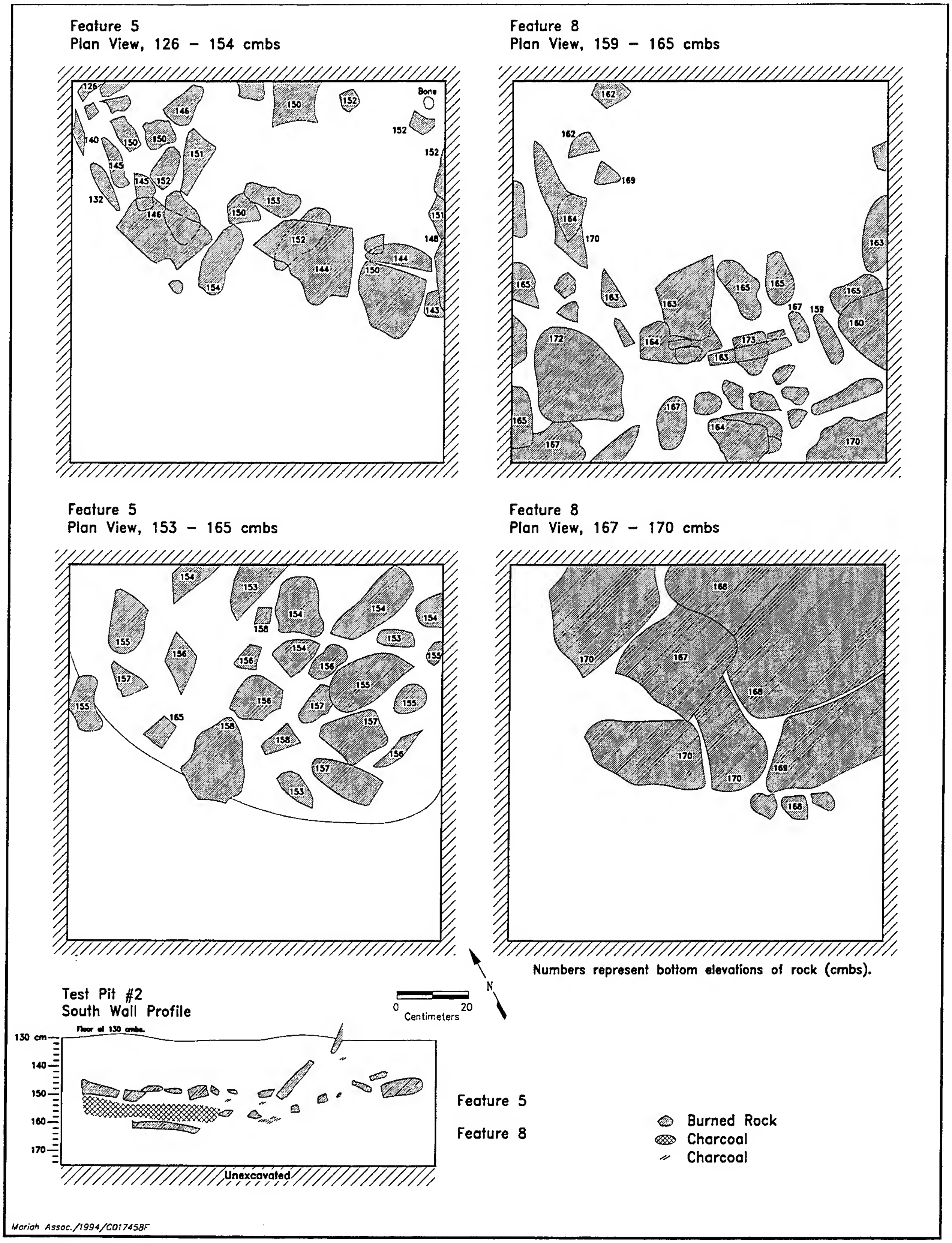

Figure 6.39 Profile and Successive Plans of F 5 and F 8, TP 2, 41CV174.

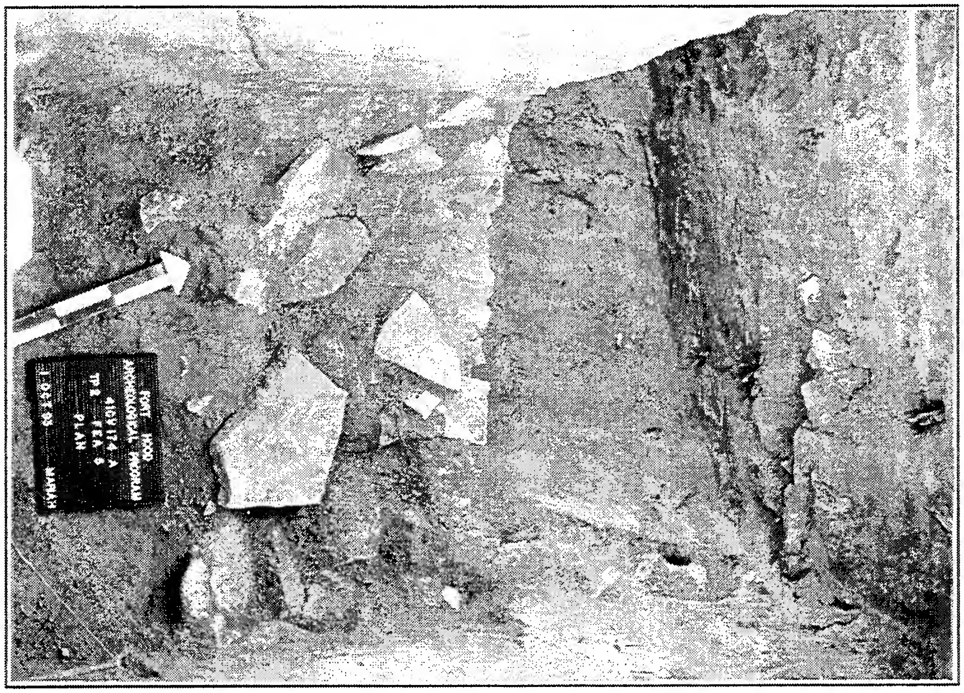

Figure 6.40 Planview of F 5, 41CV174, Looking North.

unknown plant, which may represent a prehistoric foodstuff. Although a portion of this feature was destroyed during trenching, the integrity of F 8, within TP 2, was excellent. Remaining portions of F 8 are present in the matrix adjacent to TP 2.

Trench 5 was excavated into the swale immediately below (north of) the large burned rock midden (F 1). Like BT 1, BT 5 exposed the contact between an older fill at the edge of the higher surface, and at least one, but probably two, alluvial fills beneath the lower surface. At the southern end of this trench, the younger alluvial fill(s) was (were) clearly observed lapping onto an older, very slightly rubified deposit which is inferred to be the Fort Hood alluvium. The younger alluvium draping the northward dipping unconformity contained numerous burned rocks which probably are in secondary context, having been eroded from the feature on the leading (northern) edge of the higher surface. In the northern half of the trench (see Figure 6.36), an A-AB-Bk-BC profile was observed in the top 160 cm. The calcic horizon formed in this sediment was very weakly expressed, and suggests that this deposit is associated with the Ford alluvium. The deposit graded from a laminated sand, silt loam, and silty clay loam near the base of the unit into a clay to silty clay loam near the ground surface, and probably represents either a locally ponded depression on the floodplain or a channel plug. An unconformity at approximately 170 cmbs contained significantly more filamental carbonate and was interpreted as a 2Bk horizon that probably correlates with Nordt's West Range alluvium.

A lens of bison bone was exposed within the younger fill in the east wall of BT 5 at a depth of 150 to 170 cmbs, at the base of the Ford alluvium. During trenching, several bison bones and numerous ceramic sherds were collected from the backdirt pile. Fifty sherds appear to be from a single Leon Plain vessel (catalog number 1-174-284). Three rim sherds are present, and only three of the 50 sherds could be matched together, forming a partial base/side reconstruction about 7

x 3 cm in size. Based on the rim sherds, the vessel appears to be a jar with an opening diameter of about 3.2 cm, and with a straight to slightly flaring rim profile. Judging from the color and consistency of soil adhering to the sherds, the ceramics were most likely from the upper portion of the trench. An AMS radiocarbon age of 180 ± 60 BP was obtained from charcoal adhering to one of the sherds, indicating the vessel dates to the historic period. No cultural material was exposed in the trench walls below the bone lens.

Test pit 3 was placed above a portion of the exposed bone lens and excavated to 180 cmbs. In the upper levels of the pit, several flakes, bone fragments, and burned rocks were recovered from 0 to 50 cmbs. In addition to these artifacts, a ceramic sherd from the same vessel was found from 20 to 30 cmbs, confirming the deposit containing the vessel was at the top of the trench, well above the bison bone lens. From 50 to 150 cmbs, only a couple of flakes, bone fragments, and burned rocks were found. The bison bone lens was encountered at 150 to 160 cmbs, but the majority of the bone was exposed from 160 to 170 cmbs and literally covered the entire test pit (Figure 6.41). Bone identified included several ribs and thoracic vertebrae, a femur, a scapula, a skull, and a mandible. The skull and scapula extended well into the east wall of the test pit and were not removed. While the vast majority of the bone was in excellent condition, insulation foam was used (Bement 1985) to facilitate intact removal of the mandible. Obvious butcher marks were not visible on the bone; however, two fractured bone fragments and two burned long-bone ends were found amongst the exposed bone, which suggests that processing activities did occur. This evidence, along with the overall intense occupation at the site, suggests that the bone lens is a cultural rather than natural occurrence. No cultural material was found below the bone from 170 to 180 cmbs.

Trench 6, the last trench excavated on the lower surface, was situated 10 m from the cutbank overlooking Table Rock Creek to the northwest of BT 5. This trench exposed a channel-proximal

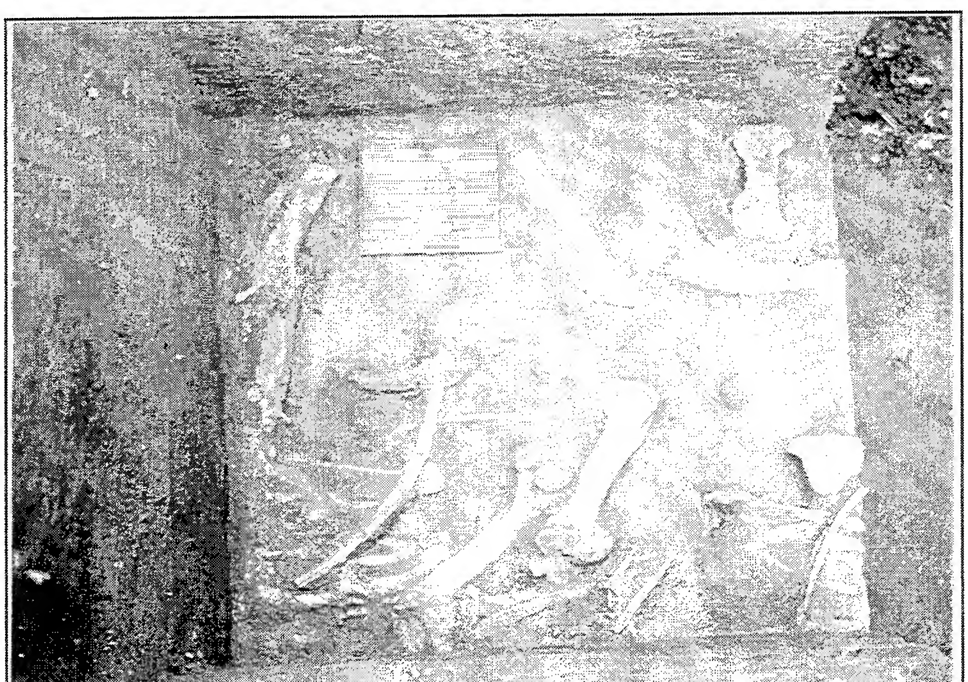

Figure 6.41 Planview of Bison Bone Lens in TP 3, 41CV174, Looking Southwest.

facies of a fill that could be either the Ford or West Range alluvium. Three normally graded (fining upward) bodies of sediment were present in this trench. The youngest of these comprised the top 43 cm of the profile and much of this appeared to have been disturbed, possibly by cultivation. A weak, buried A horizon was observed between 43 and 69 cmbs, and a burned rock feature was observed near the base of this soil. Another weakly developed buried soil was observed between 86 and 106 cmbs. This soil is situated at the top of the lowest fining upward depositional unit, which extended between 86 cmbs and the base of the trench (about 270 cmbs). A distinct channel component was present in this trench below 150 cm depth, where an imbricated gravel was observed. The weak pedogenic expression and apparent cyclical sedimentation suggests that this deposit correlates with the Ford alluvium of Nordt (1992).

In the west wall of BT 6, a basin-shaped hearth was exposed at 50 to 70 cmbs. The hearth was designated F 4. No cultural material was observed below the feature, within the walls of the trench. Test pit 4 was placed above F 4 and excavated to the bottom of the hearth (70 cmbs). No cultural material was found in the levels excavated above the feature (0 to 50 cmbs). Feature 4 consisted of an ovate, basin-shaped hearth (Figure 6.42). Although the eastern portion of the feature was destroyed during trenching, an 80 cm long x 40 cm wide portion of the hearth remained intact (Figure 6.43). Internally, the feature contained 115 burned rocks (20 kg total) lying above a 3 to 7 cm thick lens of charcoal. The majority of burned rock averaged 5 to 7 cm in length and 3 to 6 cm in width, with only a few measuring more than 10 cm in length. Oxidized soil was present along the edges of the feature. An abundance of charcoal, some of which was identified as hickory, was recovered from the hearth. No bone, mussel shell,

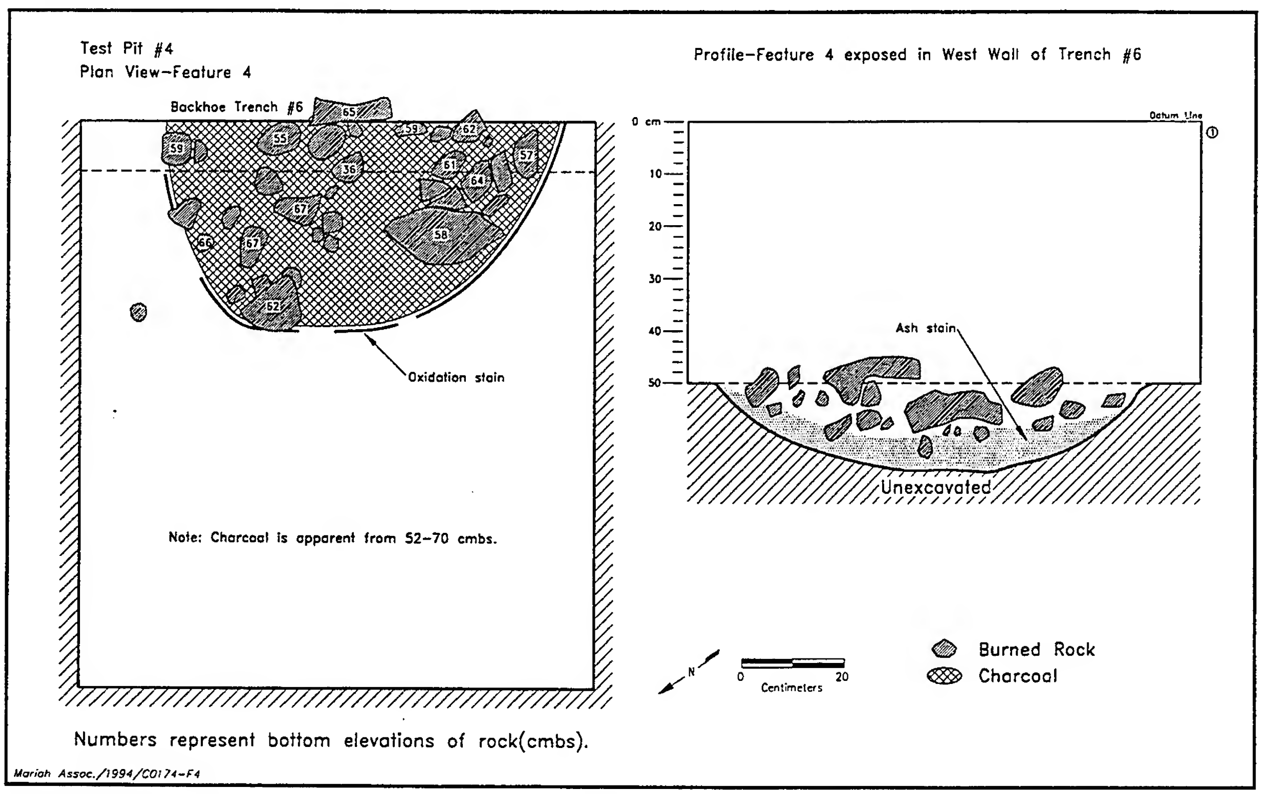

Figure 6.42 Plan and Profile of F 4, TP 4, 41CV174.

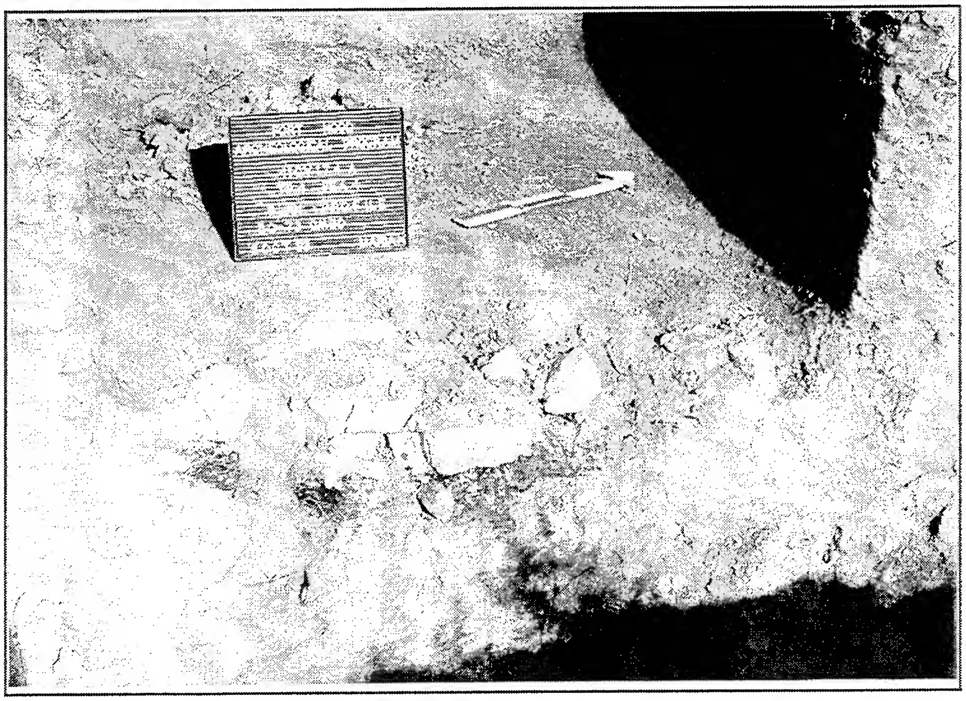

Figure 6.43 Feature 4, 41CV174, Looking West.

or chert artifacts were found in association with the feature. A radiocarbon age of 510 ± 50 BP was obtained on charcoal from the hearth indicates that the fill is equivalent to the Ford Alluvium of Nordt (1992) and that the hearth represents an occupation dating to the latter Late Prehistoric.

Five projectile tools were recovered from this AU representing Transitional Archaic through early Late Prehistoric time periods Table 6.42). Each of the points is made from a different chert type, but all from the North Fort chert zone. The general lithic tool assemblage consists of 17 tools predominately representing middle- to late-stage biface manufacture balanced by minimally modified unfacial tools (Table 6.43). Nine chert varieties are present that represent the chert zones identified and the indeterminate categories as well.

Thirteen identified chert types and nine indeterminate chert categories are represented in the debitage assemblage recovered from AU 1 at 41CV174 (Table 6.44). Despite this diversity, only 10% of the overall assemblage was identified. As a result of this low identification rate, the aggregate indeterminates occurred in greater than expected frequency and all of the identified types

Table 6.42 Projectile Points, AU 1, 41CV174.

	Lithic Material					
Point Type	08-FH Yellow	14-FH Gray	15-Gry/Brn/Grn	Indet Dk Brown	Indet Dk Gray	Total
Bonham	0	0	0	0	1	1
Edgewood	1	0	0	1	0	2
Ensor	0	0	1	0	0	1
Scallorn	0	1	0	0	0	1
Total	**1**	**1**	**1**	**1**	**1**	**5**

occurred in less than expected frequencies when the entire assemblage was considered. When the indeterminates were excluded, all of the types were represented in the expected range but Fort Hood Yellow, which occurred in greater than expected frequency (Table 6.45). Indeterminates are dominated by light brown flakes (70% of the total assemblage), with dark brown and light gray flakes the only other indeterminate categories occurring in any appreciable frequency.

All four chert provinces are represented in the identified fraction. The most strongly represented provinces are North Fort, with four types (Fort Hood Yellow, Fort Hood Gray, Gray/Brown/Green, and Owl Creek Black) comprising 38% of the identified total, and the Cowhouse province, with five types (Cowhouse Mottled, Cowhouse Dark Gray, Cowhouse Light Gray, Cowhouse Mottled/Banded, and Cowhouse Novaculite) comprising 30% of the identified total. The distant Southeast Range province is relatively well represented, with three types (Heiner Lake Tan, Heiner Lake Blue, and Fossiliferous Pale Brown) comprising 22% of the total. In contrast, the local West Fort province is represented by one type (Anderson Mountain Gray), comprising 8% of the identified fraction.

The assemblage is dominated by relatively small flakes (80% between 0.5 cm and 1.8 cm), suggesting that latter-stage reduction predominated (Table 6.44). However, only 69% of the assemblage is decortified, and two primary decortification flakes were recovered, suggesting that all stages of reduction were practiced (Table 6.46). Of the 31% of the assemblage that retains cortex, only 16% are clearly stream-abraded.

Faunal recovery from AU 1 was relatively rich and varied (Table 6.47). In addition to the bison remains previously discussed, taxa represented include deer, pronghorn, indeterminate artiodactyl, *Canis* sp. (dog, coyote, or wolf), colubrid snake, cottontail rabbit, and turtle. A relatively small sample of mussels, including a minimum of three species representing micro-environments ranging from still pools to flowing water, was also recovered. Approximately 10% of the bone exhibited obvious signs of human modification, which was limited to burning and spiral fracturing. No cut marks were identified on any of the recovered bone from AU 1.

Table 6.43 Lithic Tools, AU 1, 41CV174.

	Tool Type					
Lithic Material	late stage biface	middle stage biface	preform	uniface	utilized flake	Total
06-HL Tan	0	1	0	1	0	2
08-FH Yellow	0	0	1	0	0	1
09-HL Tr Brown	0	1	0	0	0	1
14-FH Gray	0	1	0	0	0	1
19-C Dr Gray	0	0	0	1	0	1
22-C Mott/Flecks	1	0	0	0	0	1
Indet Dk Brown	1	0	0	1	0	2
Indet Lt Brown	0	0	1	3	0	4
Indet Lt Gray	1	0	0	1	1	3
Indet Misc.	0	0	0	1	0	1
Total	**3**	**3**	**2**	**8**	**1**	**17**

A total of 53(56) prehistoric ceramic sherds were recovered from this site representing three vessels. One of these is the aforementioned Leon Plain vessel. One sherd of this vessel, and two sherds representing the other vessels, were submitted for petrographic analysis. The control sand samples from the Leon and Lampassas rivers and Cowhouse Creek compare favorably with the constituents identified in these vessels, excluding the bone-tempering. The suggestion by Reese-Taylor (Appendix F) is that the bone-tempered vessels are made from local sources.

6.5.2.2 Excavations in the Upper Terrace Surface

Feature 1 consists of an extensive burned rock midden located at the eastern portion of the upper terrace. Observations of the feature were based on surface exposure and the extent of vandalism. The feature is 110 m long x 50 m wide. Numerous, large potholes and piles of backdirt are present throughout the feature. Backhoe trench 2 was excavated in the feature. It revealed an A-AB-Bk profile where the top 65 cm of the profile was an anthropic epipedon associated with F 1. The midden extended from the present ground surface to 90 cmbs and appeared to be almost totally disturbed, with the possible exception of a few areas at the extreme base of the feature. The disturbed portions of the feature appeared to possess abrupt boundaries with the underlying AB horizon, whereas the few undisturbed portions of the feature exhibited a gradational boundary between the anthropic epipedon (A horizon) and the AB horizon. The calcic horizon was formed in sediment that appeared to be slightly more rubified than the deposits beneath the lower surface, but these sediments still possessed 10YR hues. The stratigraphic position and appearance of the Bk horizon suggest that this fill correlates with the Fort Hood alluvium, but the onlap of younger fills onto this surface, as exhibited in BT 5, suggests that some, if not all, of the A horizon on this surface may have been deposited during the late Holocene, after the majority of Fort Hood sedimentation had ceased.

Table 6.44 Debitage Recovery by Size and Material Type, AU 1, 41CV174.

	Debitage Size						
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types							
03-AM Gray	0	0	2	1	0	0	3
06-HL Tan	0	0	0	0	0	4	4
07-Foss Pale Brown	0	0	0	1	0	0	1
08-FH Yellow	0	1	3	4	0	0	8
10-HL Blue	0	0	0	1	1	1	3
14-FH Gray	0	0	2	0	0	0	2
15-Gry/Brn/Grn	0	0	0	2	0	1	3
17-Owl Crk Black	0	0	0	0	1	0	1
18-C Mottled	0	0	0	0	0	1	1
19-C Dr Gray	0	0	0	0	2	3	5
21-C Lgt Gray	0	0	0	1	1	0	2
23-C Mott/Banded	0	0	0	1	1	0	2
27-C Novaculite	0	0	0	0	0	1	1
Subtotal	*0*	*1*	*7*	*11*	*6*	*11*	*36*
Unidentified Types							
Indet Black	0	1	0	1	0	0	2
Indet Dk Brown	0	14	9	11	4	2	40
Indet Dk Gray	0	0	0	1	0	0	1
Indet Lt Brown	7	76	68	66	30	9	256
Indet Lt Gray	0	3	7	6	0	1	17
Indet Misc.	0	1	0	1	0	0	2
Indet Mottled	0	0	1	0	0	0	1
Indet Trans	1	1	2	0	0	0	4
Indet White	0	1	2	1	0	0	4
Subtotal	*8*	*97*	*89*	*87*	*34*	*12*	*327*
Total	**8**	**98**	**96**	**98**	**40**	**23**	**363**

Test pit 5 was excavated on F 1 (Figure 6.44). The pit was placed on a small "island" between two large potholes and excavated to 130 cmbs. The top 20 cm of this pit had been disturbed by dense root growth and colluvial slope wash, and yielded a couple of bone fragments, several burned rocks, and a .22 caliber bullet. The top of F 1 was encountered at 20 cmbs, and the base was identified by a sharp decline in the amount of burned rock and a soil change which sloped from 80 to 95 cmbs. Within TP 5, the upper levels of F 1 contained relatively low amounts of burned rock, the central levels contained very abundant burned rock, and the lower levels exhibited a steady decline to the base of the midden. Frequencies ranged from 13 pieces (3 kg) from 20 to 30 cmbs, to over 1,500 pieces (70 kg) from 50 to 60 cmbs, to about 200 pieces (21 kg) from 90 to 100 cmbs. The burned rock was angular in shape, ranged from small gravels up to pieces 15 cm in diameter, and exhibited gray, reddish, and orange hues. Although several large roots were growing through

Table 6.45 Binomial Statistic Results, AU 1, 41CV174.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	Total	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
03-AM Gray	3	16	35	less	0	6	expected
06-HL Tan	4	16	35	less	0	6	expected
07-Foss Pale Brown	1	16	35	less	0	6	expected
08-FH Yellow	8	16	35	less	0	6	more
10-HL Blue	3	16	35	less	0	6	expected
14-FH Gray	2	16	35	less	0	6	expected
15-Gry/Brn/Grn	3	16	35	less	0	6	expected
17-Owl Crk Black	1	16	35	less	0	6	expected
18-C Mottled	1	16	35	less	0	6	expected
19-C Dr Gray	5	16	35	less	0	6	expected
21-C Lgt Gray	2	16	35	less	0	6	expected
23-C Mott/Banded	2	16	35	less	0	6	expected
27-C Novaculite	1	16	35	less	0	6	expected
Total Indet	327	16	35	more	na	na	na

the feature within TP 5, no evidence of vandalism was observed. The results of the excavation of TP 5 suggest that despite widespread heavy damage, portions of the midden are relatively undisturbed. Surprisingly low frequencies of flakes and ecofacts were found. In addition to these artifacts, two Pedernales dart points were recovered from the base of the feature from 90 to 100 cmbs. Below F 1, frequencies of artifacts declined sharply from 100 to 130 cmbs, although several flakes and burned rocks continued to be found. In addition to these artifacts, an Andice and Bulverde point were recovered from 110 to 120 cmbs.

Backhoe trench 7 was placed into the colluvial slope along the southern edge of the site and exposed a colluvial-alluvial facies which is believed to largely correlate with the Fort Hood alluvium, although the top 1 to 1.5 m of this profile on the toeslope may be of middle to late Holocene age (Figure 6.45). In the east wall of the trench, a 2.5 m long lens of dense burned rock was exposed at about 1.2 mbs. This burned rock feature was designated F 6. No cultural material was observed below F 6 in BT 7.

Test pit 7 was placed above F 6 and excavated to 140 cmbs (Figure 6.46). In the upper levels of the pit, several flakes and a few burned rocks were found from 0 to 60 cmbs. From 60 to 130 cmbs, F 6 was encountered. The feature consisted of a burned rock midden, and was visible in east wall of BT 7 from 1.1 to 1.3 mbs. Excavation of the test pit revealed that the midden was much thicker than originally estimated based on the backhoe trench exposure. In TP 7, frequencies of burned rock increased with depth and counts ranged from 15 pieces (1.5 kg) from 60 to 70 cmbs, to 280 pieces (102.5 kg) from 110 to 130 cmbs. A total of 428 angular and tabular burned rocks (128.75 kg) ranging in size from small gravels to pieces 14 cm in length were recovered from the midden. In addition to the burned rock, unburned gravels and angular limestone fragments were present throughout the feature, indicating ongoing colluvial sedimentation as the feature accreted. Given the close proximity of TP 7 to the margin of F 1 on the terrace surface, it is likely that F 6 represents an extension of the larger feature buried in the subsurface. Only a couple of burned rocks were found from 130 to 140 cmbs, verifying the base of the midden was reached at 130 cmbs. A

Table 6.46 Debitage Cortex Characteristics by Material Type, AU 1, 41CV174.

Lithic Material	All Cortex: Abraded	Partial Cortex: Abraded	Partial Cortex: Unabraded	Partial Cortex: Indeterminate	No Cortex	Indeterminate	Total
Identified Types							
03-AM Gray	0	0	0	0	3	0	3
06-HL Tan	0	0	0	1	3	0	4
07-Foss Pale Brown	0	0	0	0	1	0	1
08-FH Yellow	0	0	0	3	5	0	8
10-HL Blue	0	0	0	1	2	0	3
14-FH Gray	0	0	0	1	1	0	2
15-Gry/Brn/Grn	0	0	0	1	2	0	3
17-Owl Crk Black	0	0	0	0	1	0	1
18-C Mottled	0	0	0	1	0	0	1
19-C Dr Gray	0	0	0	0	4	1	5
21-C Lgt Gray	0	0	0	0	2	0	2
23-C Mott/Banded	0	1	0	0	1	0	2
27-C Novaculite	0	0	0	0	1	0	1
Subtotal	*0*	*1*	*0*	*8*	*26*	*1*	*36*
Unidentified Types							
Indet Black	0	0	0	0	2	0	2
Indet Dk Brown	0	1	0	11	28	0	40
Indet Dk Gray	0	0	0	0	1	0	1
Indet Lt Brown	2	14	10	60	169	1	256
Indet Lt Gray	0	0	0	1	16	0	17
Indet Misc.	0	0	0	0	1	1	2
Indet Mottled	0	0	0	1	0	0	1
Indet Trans	0	0	0	1	3	0	4
Indet White	0	0	0	0	4	0	4
Subtotal	*2*	*15*	*10*	*74*	*224*	*2*	*327*
Total	**2**	**16**	**10**	**82**	**250**	**3**	**363**

radiocarbon age of 5240 ± 50 BP (Beta b-75157) was obtained from the feature, suggesting that it probably represents a feature constructed on the surface of a Fort Hood terrace that was subsequently and incrementally buried by Late Holocene overbank sedimentation.

Feature 10 (88 to 95 cmbs) consisted of a shallow, basin-shaped hearth that was located within F 6 in TP 7. The internal feature was composed of a tight cluster of 32 burned rocks (9 kg) 60 cm long x 40 cm wide x 7 cm thick. The hearth was filled with a single layer of mainly angular burned rocks; however, a few tabular pieces were present. The feature appeared to be only slightly disturbed by a few small roots. Numerous flakes, a Wilson point base, and a couple of bone fragments were associated with the hearth.

Table 6.47 Faunal Recovery, AU 1, 41CV174.

	Element																															
Vertebrates	Atlas	Calcaneus	Carapace	Costal cartilege	Distal phalange	Dorsal vertebra	Femur	Fused 2&3rd carpal	Fused 3&4th carpal	Fused 3&4th metata	Humerus	Indeterminate	Long bone	Lumbar Vertebra	Mandible	Metapodial	Middle phalange	Patella	Pelvis	Permanent tooth	Phalange	Proximal Phalange	Radius	Rib	Scapula	Thoracic vertebra	Tibia	Tooth	Ulna	Vertebra	left	right	Total
Antilocapra americana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Artiodactyla	0	1	0	0	0	0	0	1	0	0	0	4	0	0	0	1	1	0	0	0	1	2	0	0	0	0	2	1	0	0	0	0	14
Bos/Bison	0	0	0	0	0	0	2	0	1	1	0	1	0	0	0	0	0	1	0	0	0	0	1	1	0	3	2	0	0	1	0	0	14
Canis sp.	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
cf. Bison bison	1	0	0	0	0	0	1	0	0	0	3	0	0	1	1	0	0	0	0	6	0	0	1	0	0	1	0	0	1	0	0	0	16
Colubridea	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mammalia	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
Mammalia (lg/vlg)	0	0	0	7	0	0	0	0	0	0	0	59	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	67
Mammalia (med/lg)	0	0	0	7	0	0	0	0	0	0	0	365	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	374
Mammalia (sm/med)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Mammalia (very lg)	0	0	0	2	0	0	0	0	0	0	0	24	2	0	0	0	0	0	0	0	0	0	0	17	7	0	0	0	0	0	0	0	52
Odocoileus sp.	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	3
Sylvilagus sp.	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Testudinata	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Vertebrata	0	0	0	0	0	0	0	0	0	0	0	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67
Total	**1**	**3**	**1**	**16**	**1**	**1**	**3**	**1**	**1**	**1**	**3**	**539**	**3**	**1**	**1**	**1**	**1**	**1**	**1**	**7**	**1**	**3**	**4**	**19**	**7**	**4**	**5**	**1**	**1**	**2**	**0**	**0**	**634**
Bivalves																																	
Ambleminae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Lampsilinae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	4
Lampsilis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Toxolasma texasensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3
Unionacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**5**	**10**

Trench 3 was placed approximately 30 m north of BT 7 (see Figure 6.45). In the east wall of BT 3, a concentration of burned rock was exposed at 65 to 80 cmbs. This concentration was designated F 9. No cultural material was observed below the feature within the trench walls. Test pit 6 was placed above F 9 and excavated to the base of the feature. In the upper levels of the pit, several flakes and a few burned rocks were recovered from 0 to 50 cmbs. In addition to these artifacts, two prehistoric ceramic sherds were found in the upper 10 cm. The top of F 9 was encountered at 50 cmbs and the bottom was reached at 80 cmbs.

Feature 9 was initially thought to be a single construct; however, during the excavation of TP 6, it became apparent that two separate burned rock concentrations were present. The upper concentration (50 to 60 cmbs) consisted of 45 scattered, angular burned rocks (9 kg total) and the lower concentration (70 to 80 cmbs) consisted of 48 unpatterned, angular burned rocks (17 kg total).

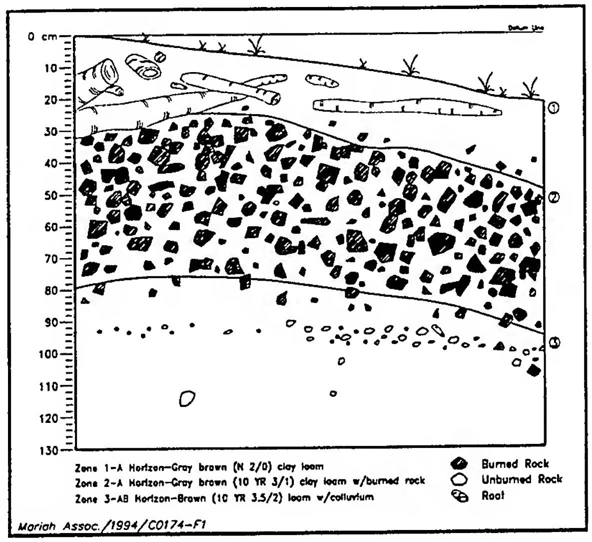

Figure 6.44 Profile of West Wall, TP 5, F 1, 41CV174.

The rock in the lower concentration was one to two tiers thick and the size of the rock ranged from gravels up to pieces 10 cm in diameter. The

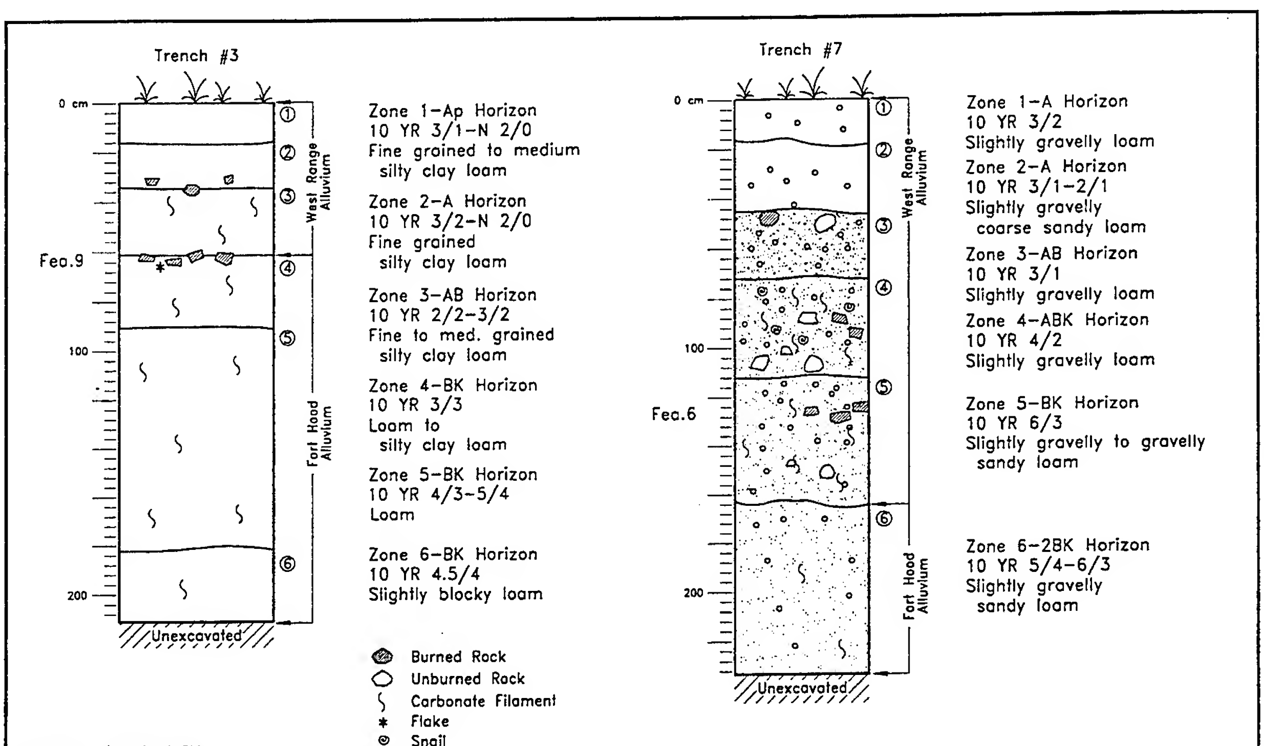

Figure 6.45 Measured Sections, BTs 3 and 7, 41CV174.

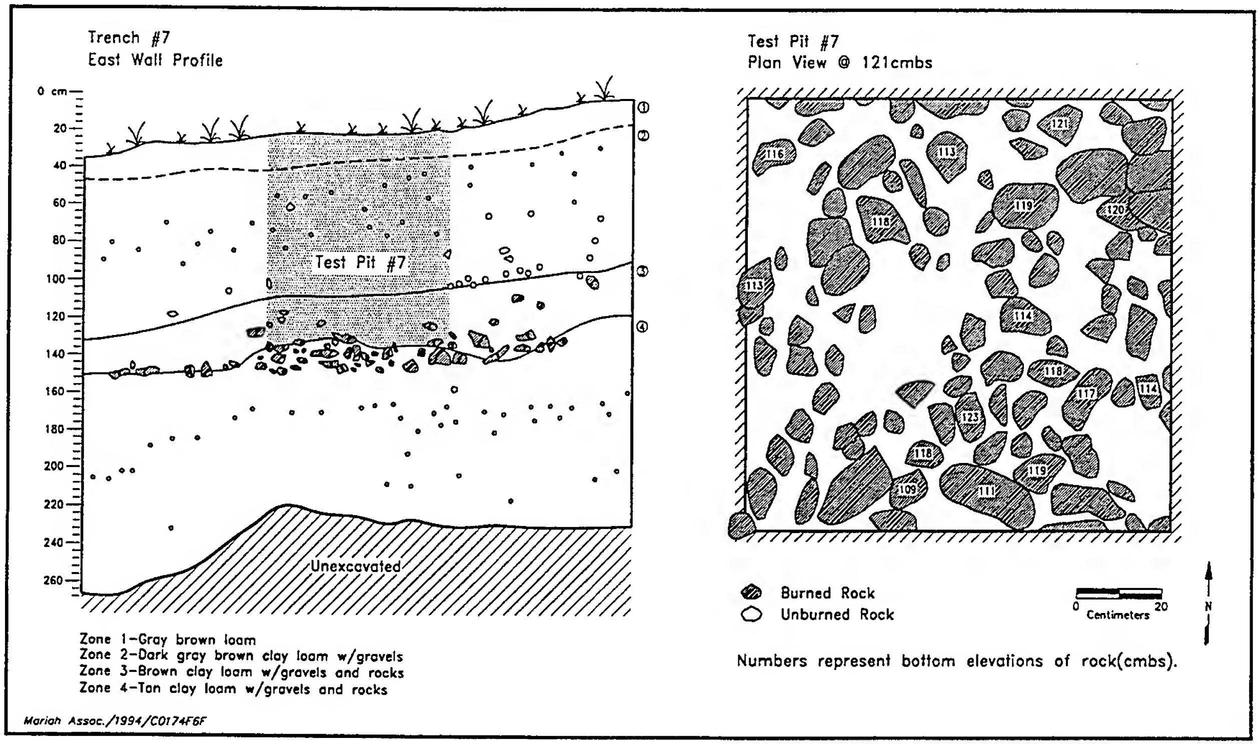

Figure 6.46 Profile (BT 7) and Plan (TP 7) of F 6, 41CV174.

concentrations were separated by 10 cm of fill that contained 10 small fragments of burned rock (1 kg). A few flakes, a Nolan point base, and a piece of groundstone were recovered from the feature.

The deposits exposed by BT 3 were very similar to BT 2, except the density of cultural material was considerably lower in BT 3. An Ap-A-AB-Bk soil profile was observed formed in medial to distal overbank sediments which ranged in texture from a loam near the base of the trench to a silty clay loam near the ground surface. The majority of these sediments are tentatively correlated with the Fort Hood alluvium. However, the general conclusion that the A horizon represents a late Holocene drape is supported by the recovery of ceramic sherds from the upper part of TP 6.

Six dart points were recovered from this AU (Table 6.48) representing three identified chert zones and a indeterminate type. The two Pedernales points come from F 1 and the Nolan from F 9. The presence of the points suggests Middle and Early Archaic dates. The tools from the AU reflect all stages of biface manufacture as

Table 6.48 Projectile Points, AU 2, 41CV174.

	Lithic Material				
Point Type	06-HL Tan	14-FH Gray	18-C Mottled	Indet Lt Brown	Total
Andice	1	0	0	0	1
Bulverde	0	1	0	0	1
Nolan	0	0	0	1	1
Pedernales	1	0	1	0	2
Wilson	1	0	0	0	1
Total	**3**	**1**	**1**	**1**	**6**

well food processing and possible wood-working activities (Table 6.49). This AU produced one of the few groundstone specimens from the testing at the base. The chert varieties reflect the spectrum of available types.

Eleven identified chert types and nine indeterminate chert categories were included in the debitage recovered from tests placed on the higher surface (Table 6.50). Approximately 20% of the assemblage was identified. When the entire assemblage was considered, the aggregate indeterminates occurred in greater than expected frequency and each of the identified types occurred in less than expected frequency. When the indeterminates were excluded, Heiner Lake Tan, Fort Hood Yellow, and Cowhouse Mottled occurred in greater than expected frequency; Anderson Mountain Gray, Heiner Lake Translucent Brown, Cowhouse Mottled/Flecked, and Cowhouse Mottled/Banded occurred in the expected range; and Heiner Lake Blue, Fort Hood Gray, Gray/Brown/Green, and Owl Creek Black occurred in less than expected frequency (Table 6.51).

All four chert provinces are represented in the assemblage. Once again, the "local" West Fort province, which is characterized by relatively poor material that does not actually crop out anywhere near 41CV174, is the most poorly represented, with one chert type comprising less than 5% of the identified fraction. The most strongly represented province, with three types comprising 41% of the identified total, is the Cowhouse Creek channel. Both the Southeast Range and North Fort are relatively well represented, with three types comprising 29% and four types comprising 25% of the identified total, respectively.

The size distribution is similar to the distribution in the assemblage from AU 1. Approximately 82% of the total assemblage is between 0.5 and 1.8 cm in size, suggesting that latter-stage reduction predominated (Table 6.50). More than 81% of the assemblage was decortified, supporting this interpretation. Approximately 42% of the cortical flakes exhibited abraded cortex, 18% were unabraded, and 40% were indeterminate,

Table 6.49 Nonprojectile Point Lithic Tools, AU 2, 41CV174.

	Tool Type								
Lithic Material	early stage biface	late stage biface	middle stage biface	metate	preform	uniface	utilized flake	wedge	Total
06-HL Tan	0	0	1	0	0	0	0	0	1
07-HL Tr Brown	0	0	1	0	0	0	0	0	1
15-Gry/Brn/Grn	0	2	1	0	0	0	0	0	3
18-C Mottled	0	0	0	0	0	1	0	0	1
19-C Dr Gray	0	0	0	0	1	0	0	0	1
22-C Mott/Flecks	1	1	0	0	0	0	0	1	3
Indet Dk Brown	0	0	0	0	0	0	0	1	1
Indet Lt Brown	0	0	0	0	0	5	0	0	5
Indet Mottled	0	1	0	0	0	0	2	0	3
Limestone	0	0	0	1	0	0	0	0	1
Total	**1**	**4**	**3**	**1**	**1**	**6**	**2**	**2**	**20**

suggesting that alluvial deposits formed a significant source for the material subjected to early-stage reduction on site. This finding is relatively unsurprising, given the strong contribution of the alluvial chert types from the Cowhouse province to the overall assemblage (Table 6.52).

A very small, fragmentary faunal assemblage was recovered from AU 2 (Table 6.53). Although most of this material appears to represent deer-sized to bison-sized animals, and several elements represent Artiodactyl remains, no individual species were identifiable in the assemblage.

6.5.2.3 Site-Level Synthesis

Multiple alluvial fills are present at this site and cultural material was observed throughout alluvial units of late Holocene age (the West Range and Ford alluvia of Nordt 1992) and near the top of deposits of early to middle Holocene age (the Fort Hood alluvium of Nordt 1992). Cultural occupations, ranging in age from Middle Archaic to Protohistoric, are preserved in the relatively complex stratigraphy. Most of the material is stratified in relatively thick Late Holocene fills underlying the lower surface and in a drape of the same later material that rests on top of an earlier fill on the upper terrace. However, it is likely that the large midden (F 1) on the upper surface was constructed on a relatively stable Fort Hood-age terrace and subsequently partially buried by repeated overbank flooding during the Late Holocene.

Table 6.50 Debitage Recovery by Size and Material Type, AU 2, 41CV174.

	Size (cm)						
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types							
03-AM Gray	0	0	2	0	1	0	3
06-HL Tan	0	0	4	5	3	0	12
08-FH Yellow	0	2	6	3	2	0	13
09-HL Tr Brown	0	0	3	2	0	2	7
10-HL Blue	0	1	0	0	0	0	1
14-FH Gray	0	0	0	0	0	1	1
15-Gry/Brn/Grn	0	1	0	0	0	0	1
17-Owl Crk Black	0	1	0	0	0	0	1
18-C Mottled	0	0	3	2	3	4	12
22-C Mott/Flecks	0	0	1	1	3	4	9
23-C Mott/Banded	0	0	0	3	2	0	5
Subtotal	*0*	*5*	*19*	*16*	*14*	*11*	*65*
Unidentified Types							
Indet Black	0	0	0	0	0	1	1
Indet Dk Brown	0	16	4	14	1	0	35
Indet Dk Gray	0	6	0	7	2	1	16
Indet Lt Brown	3	38	59	37	13	2	152
Indet Lt Gray	0	0	4	9	6	1	20
Indet Misc.	0	5	10	4	0	0	19
Indet Mottled	0	0	0	4	5	0	9
Indet Trans	0	5	1	2	0	0	8
Indet White	0	1	0	0	0	0	1
Subtotal	*3*	*71*	*78*	*77*	*27*	*5*	*261*
Total	**3**	**76**	**97**	**93**	**41**	**16**	**326**

As drawn, the boundary of the West Fort province takes in two modest bedrock/lag sources associated with remnants of the Manning surface, but also includes a large expanse of chertless terrain underlain by the Walnut Clay and Glen Rose Limestone. Although it is mapped within the boundary of the West Fort chert province, 41CV174 lies in a portion of this chertless expanse that is relatively far removed from high density chert outcrops. Likewise, because it primarily drains the Walnut Clay and Glen Rose limestone, the channel of Table Rock Creek is relatively chert poor. Therefore, prehistoric inhabitants at 41CV174 would have been forced to import much of their lithic raw material from a healthy distance. The debitage recovered from the site suggests that while manufacturing in both AUs focused on latter-stage reduction, all stages were in fact represented, and raw material was obtained from relatively distant sources, such as the Southeast Range province (approx 25 km) and the North Fort province (approx. 18 km). Additional sources to

Table 6.51 Binomial Statistic Results, AU 2, 41CV174.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Maximum	Expected Maximum	Results	Expected Maximum	Expected Maximum	Results
03-AM Gray	3	17	37	less	2	11	expected
06-HL Tan	12	17	37	less	2	11	more
08-FH Yellow	13	17	37	less	2	11	more
09-HL Tr Brown	7	17	37	less	2	11	expected
10-HL Blue	1	17	37	less	2	11	less
14-FH Gray	1	17	37	less	2	11	less
15-Gry/Brn/Grn	1	17	37	less	2	11	less
17-Owl Crk Black	1	17	37	less	2	11	less
18-C Mottled	12	17	37	less	2	11	more
22-C Mott/Flecks	9	17	37	less	2	11	expected
23-C Mott/Banded	5	17	37	less	2	11	expected
Total Indet	261	17	37	more	na	na	less

the west and south, which remain largely unidentified, were also probably exploited.

Although subsistence generalizations for this large, multicomponent site are tentative at best given the available data, extant faunal data from the site suggests a primary reliance on relatively large game, including bison, deer, and pronghorn. While other types of game were also probably taken, the record of smaller animals is somewhat limited, as is the record of aquatic resources, including fish and shellfish.

6.5.4 Conclusions and Recommendations

Abundant archeological materials and features indicate repetitive occupation over extended periods of time, especially during the late Holocene. The presence of abundant charred materials and well-preserved bone imply rapid burial (Ferring 1986). The available radiocarbon data and similarities in the construction of Fs 5, 7, and 8, all of which are at the same depth below surface, suggests that these features were constructed and used during occupations at the site dating roughly from the Late Archaic/Late Prehistoric transition. If all of these phenomena are associated with closely spaced occupations, then this site contains a wealth of archeological information relevant to technological issues outlined in Ellis (1994a) that are virtually ideal for applications of the research structure delineated in Ellis (1994b). Although much of the extensive burned rock midden (F 1) has been hopelessly destroyed, remaining intact portions can be integrated into research at other portions of the site. The close proximity of numerous hearth features to F 1 suggests that it may be realistic to expect that functional relationships between hearths and middens can be explored in detail at this site. Given the presence of well-preserved faunal and charred botanical materials, it also is realistic to expect that the site can provide a solid data base for exploring the uses of burned rock technologies.

On this basis, site 41CV174 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because most known eligible components are relatively deeply buried, they are fairly well protected from training and other activities that affect only the surface of the site. However, adverse impacts from uncontrolled excavations (as evidenced by extensive vandalism of F 1) still pose

a substantial threat. On 23 February 1994, Nancy Kenmotsu (THC), Kimball Smith (DEH, Fort Hood), and Nick Trierweiler, Lain Ellis, Jim Abbott, and Gemma Mehalchick (Mariah) conducted a field inspection of the site. During this visit, all seven open backhoe trenches and seven open 1 x 1 m test pits were inspected. At this time, no evidence of vandalism was noted. Two weeks later, on 10 March 1994, Karl Kleinbach (Mariah) and Lester Duncan (DEH, backhoe operator) returned to 41CV174 to backfill all trenches and test pits. During this visit, Kleinbach noted that vandalism had occurred. In BT 2, excavated through F 1, approximately 1 m^2 of deposit had been removed along the base of the trench walls. In BT 7 and TP 7, F 6 (midden deposit) which had been visible in the trench and unit profiles, was also vandalized, with 100% of remaining feature fill (0.8 m^2) having been removed from the wall profiles. Although all test pits and trenches are now backfilled, the evidence of ongoing vandalism at the site suggests that the implementation of protective measures at this site should be given relatively high priority.

Furthermore, a possible protohistoric occupation is present at approximately 50 cmbs in an open portion of the site. Impacts from heavy vehicles, especially if the ground is wet, could seriously affect what may be a rarely encountered archeological phenomenon. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, (2) prevent mechanical or manual excavations by military personnel, and (3) minimize the impact of traffic on the lower surface.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Table 6.52 Debitage Cortex Characteristics by Material Type, AU 2, 41CV174.

	Partial Cortex				
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Total
Identified Types					
03-AM Gray	0	0	1	2	3
06-HL Tan	1	1	0	10	12
08-FH Yellow	1	0	0	12	13
09-HL Tr Brown	0	1	0	6	7
10-HL Blue	0	0	0	1	1
14-FH Gray	0	0	0	1	1
15-Gry/Brn/Grn	1	0	0	0	1
17-Owl Crk Black	0	0	0	1	1
18-C Mottled	3	1	3	5	12
22-C Mott/Flecks	2	0	0	7	9
23-C Mott/Banded	2	0	0	3	5
Subtotal	*10*	*3*	*4*	*48*	*65*
Unidentified Types					
Indet Black	0	1	0	0	1
Indet Dk Brown	1	0	1	33	35
Indet Dk Gray	1	1	0	14	16
Indet Lt Brown	6	5	9	132	152
Indet Lt Gray	2	0	6	12	20
Indet Misc.	0	1	2	16	19
Indet Mottled	5	0	2	2	9
Indet Trans	0	0	0	8	8
Indet White	0	0	0	1	1
Subtotal	*15*	*8*	*20*	*218*	*261*
Total	**25**	**11**	**24**	**266**	**326**

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 200 m^2 in area. Known, relatively dense assemblages with features occur at varying depths at the site in strata ranging from about 50 cm thick to more than 150 cm thick. Thinner, more ephemeral occupations (including the possible protohistoric occupation represented by F 4) ranging from 20 to 30 cm thick also occur at varying depths. Assuming

manual excavation of deposits with an average thickness of 1 m in each block, approximate mitigation volume should equal about 200 m^2.

Larger-scale mitigation efforts at 41CV174 may yield extraordinarily robust data bases which contribute quantum, rather than incremental, advances to knowledge of Fort Hood prehistory. The above estimated mitigation volume should be regarded as a minimum relative to the site's capacity to yield valuable information. We also recommend that any eventual mitigation at this site involve more excavation than the above estimate, and that it be pursued with the intent to acquire data sets that will become the basis for subsequent research at other sites on Fort Hood.

Table 6.53 Faunal Recovery, AU 2, 41CV174.

	Element			
Vertebrates	Indeterminate	Metapodial	Tooth	Total
Artiodactyla	0	1	2	3
Mammalia	1	0	0	1
Mammalia (lg/vlg)	2	0	0	2
Mammalia (med/lg)	14	0	0	14
Total	**17**	**1**	**2**	**20**

6.6 SITE 41CV319

6.6.1 Introduction

In late July 1993, Mariah conducted test excavations at site 41CV319. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.6.1.1 Location and Description

41CV319 is a prehistoric site with a small historic component. The site is situated on the top of a gently sloping surface between Bee House Creek and Table Rock Creek. The site has been criss-crossed by several tank trails, some of which are very recent (Figure 6.47). However, undamaged areas occur in grid-like "islands" of trees between the trails (Figure 6.48). The majority of the site consists of Paluxy Sand deposits overlying limestone bedrock, with burned rock features observed in several locations. Juniper and oak trees with short shrubs and grasses provide the only coverage on the site. The site measures approximately 40 x 60 m (about 2,400 m^2, or 0.6 acres). For purposes of this report, the site is considered a part of the Table Rock site group.

6.6.1.2 Previous Work

The site was first recorded by Corwin during a 1978 survey, who noted several burned rock concentrations, a light scatter of lithics, and red and yellow ochre fragments. A Scallorn point was recovered. The site appeared to lack undisturbed cultural remains.

The site was revisited by Lintz and Abbott in March 1992. Archeological and geomorphological assessments completed at that time indicated potential for buried cultural material. Two burned rock features, including a burned rock mound (F 1) and a burned rock concentration (F 2), were identified, and a new site map was drafted.

A shovel testing crew returned to the site in April 1992, and excavated six shovel tests (STs A through E) ranging in depth from 40 to 80 cm. None of the tests encountered limestone bedrock, but all encountered Paluxy Sand. Shovel test B was placed in the center of F 1 and recovery included burned rock from 0 to 30 cmbs and a flake from 50 to 60 cmbs. Shovel test F was placed on the western side of F 1 and burned rock was recovered from 0 to 40 cmbs and 50 to 80 cmbs, suggesting that F 1 may contain several occupational strata. Shovel test E, placed just east of F 2, produced four flakes from 0 to 20 cm and

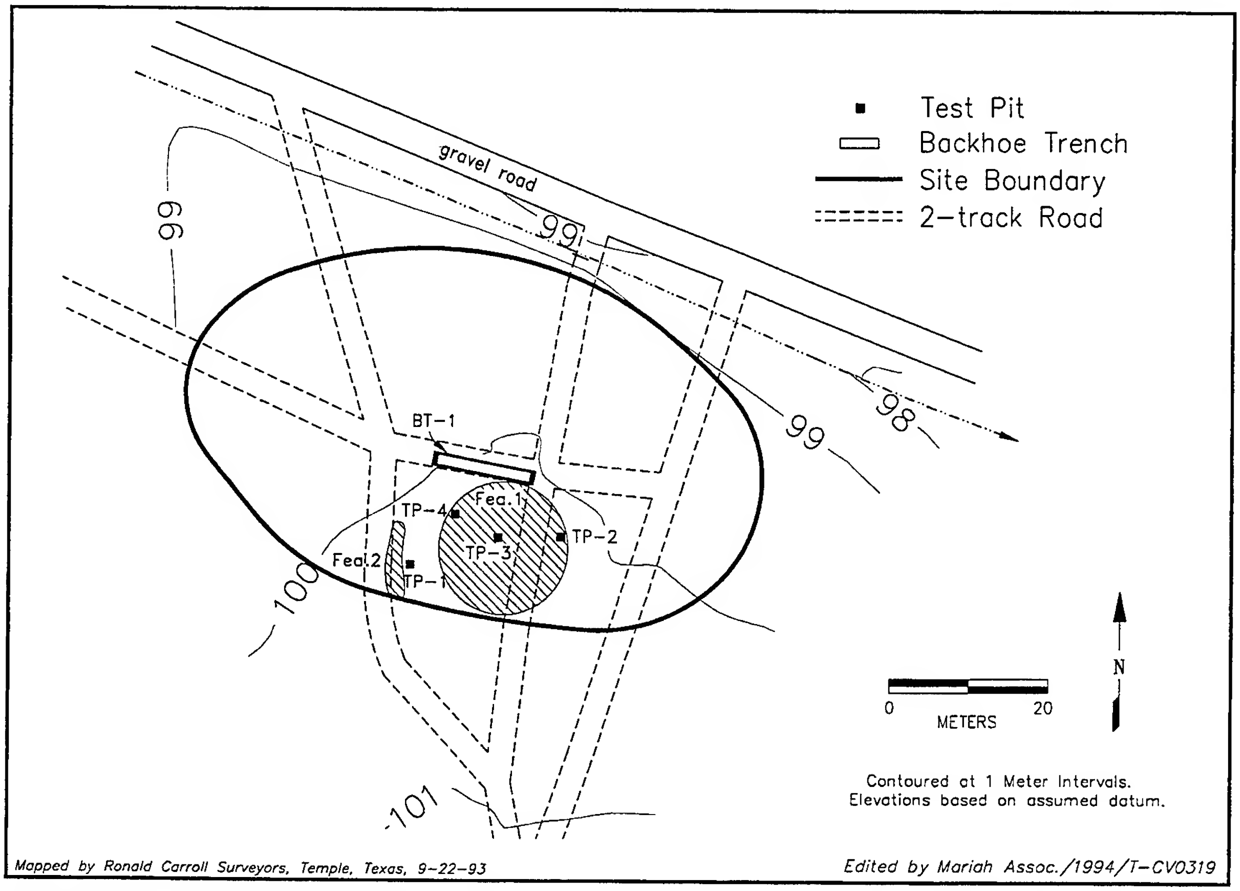

Figure 6.47 Site Map of 41CV319.

no burned rock. The remaining shovel tests (A, C, and D) yielded negative results. The site's archeological potential remained uncertain, and the site was recommended for avoidance or for formal testing if avoidance was not possible. Recommendations for formal eligibility testing included four to six manually excavated 1 x 1 m test pits and one to two backhoe trenches, including a 1 x 2 m unit and a backhoe trench on F 1 (Trierweiler 1994:A807-A808).

6.6.1.3 New Work

Four 1 x 1 m test pits (TPs 1 through 4) were manually excavated at the site (Table 6.54). Test pit 1 was placed on F 2, and the remaining three units were placed on F 1. All test pits were placed at apparently undamaged areas. A backhoe trench (BT 1) was placed north of F 1 in order to avoid unnecessary damage to remaining, potentially intact, deposits. A total of 2.2 m^2 was excavated manually. Recovered cultural materials are summarized in Table 6.55.

Table 6.54 List of Treatment Units, 41CV319.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	15	0.8	70
1	TP 1	1.0	1.0	30
1	TP 2	1.0	1.0	40
1	TP 3	1.0	1.0	110
1	TP 4	1.0	1.0	80

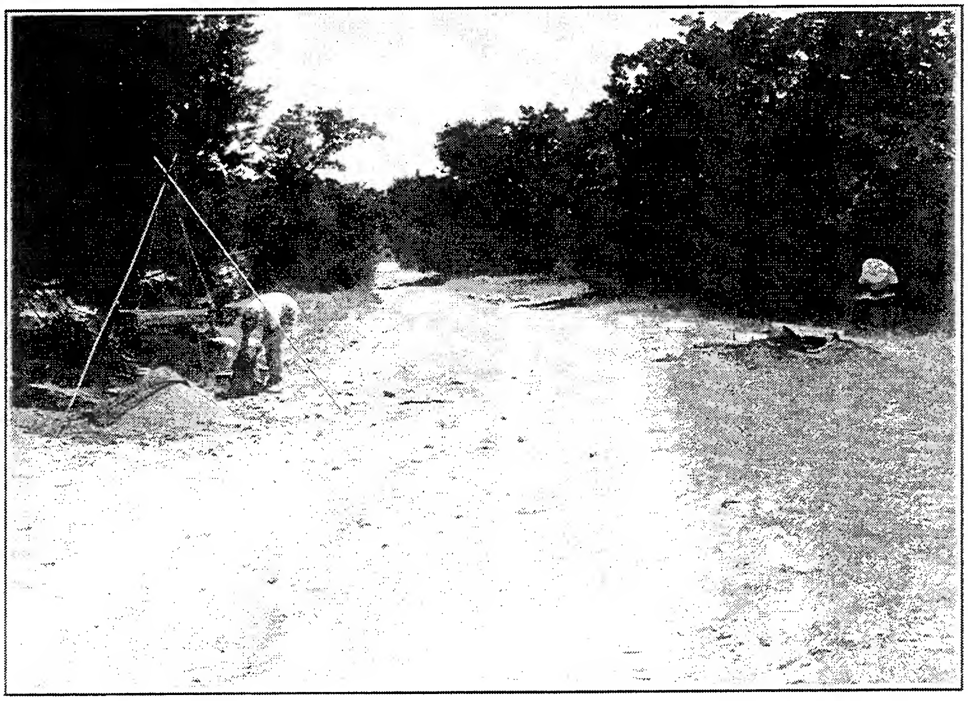

Figure 6.48 Overview of Site 41CV319, Looking South.

6.6.2 Results

Feature 1 was initially identified as a burned rock "mound" measuring approximately 16 m north-to-south x 12 m east-to-west. The feature was partially disturbed by a road that eroded the overlying sandy loam mantle and exposed the eastern part of the feature. Hundreds of tightly clustered, fist-size burned rocks in a fine, dark gray-brown matrix with some charcoal were exposed in a roadcut. Because the elevation of the feature above the surrounding ground surface was only a few centimeters, the feature was reclassified as a burned rock midden during testing. Nevertheless, it is possible that the feature was originally mounded and now shows no appreciable relief due to the poor cohesion of the sandy matrix and extensive vehicle damage.

Trench 1 was placed approximately 10 m north of F 1, and encountered limestone bedrock at 40 to 50 cmbs. The profile observed in this trench indicated that the entire Paluxy Sand outcrop had been pedogenically modified and an A-AB-Bk-R profile was formed within this deposit. The upper two horizons were very dense, undoubtedly due to compaction by military vehicles. Burned rock was observed in the A horizon and in the top 10 cm of the AB horizon. The relatively thick, dark gray-brown stratum of the feature exposed in the roadcut and revealed in TP 3, was not apparent in the trench, indicating that the trench was placed outside the boundary of the midden.

Test pit 3 was placed on the highest point of F 1 and was excavated to 110 cmbs (Figure 6.49). The profile of TP 3 revealed four major zones (Figure 6.50). The upper 10 to 15 cm was a brown sandy loam and exhibited strong compaction by vehicle traffic. This zone also contained a piece of barbed wire at 15 cmbs, and evinced an abrupt contact with underlying deposits. Feature 1 was encountered beneath the upper zone and consisted of a very dark gray, sandy, silt loam with dense burned rock, some very red and orange in color. Some charcoal was found at the base of this

Table 6.55 Artifact Recovery by Test Pit, 41CV319.

	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	6	0	6(0.3)	0	0	0	0	3(0.3)	0	0	2	0	9(1)	0	0	0	0	9(0.5)
2	0	0	17	0	14(3.5)	0	0	1	0	9(0.5)	0	0	2	0	10(1.5)	0	0	5	1	15(7)
3	0	0	0	0	0(0)	0	0	0	0	5(1)	0	0	1	0	170(89)	0	0	1	0	15(5.5)
4						0	0	0	0	0(0)	0	0	0	0	103(55)	0	0	2	0	8(0.3)
5											0	0	0	0	49(40)	0	0	0	0	7(0.3)
6											0	0	0	0	49(28)	0	0	0	0	5(0.3)
7											0	0	0	0	14(7)	0	0	0	0	5(0.3)
8											0	0	0	0	19(7)	0	0	0	0	4(0.3)
9											0	0	0	0	14(6)					
10											0	0	0	0	13(8)					
11											0	0	0	0	11(3.5)					
TOTAL	0	0	23	0	20(3.8)	0	0	1	0	17(1.8)	0	0	5	0	461(246)	0	0	8	1	68(14.5)

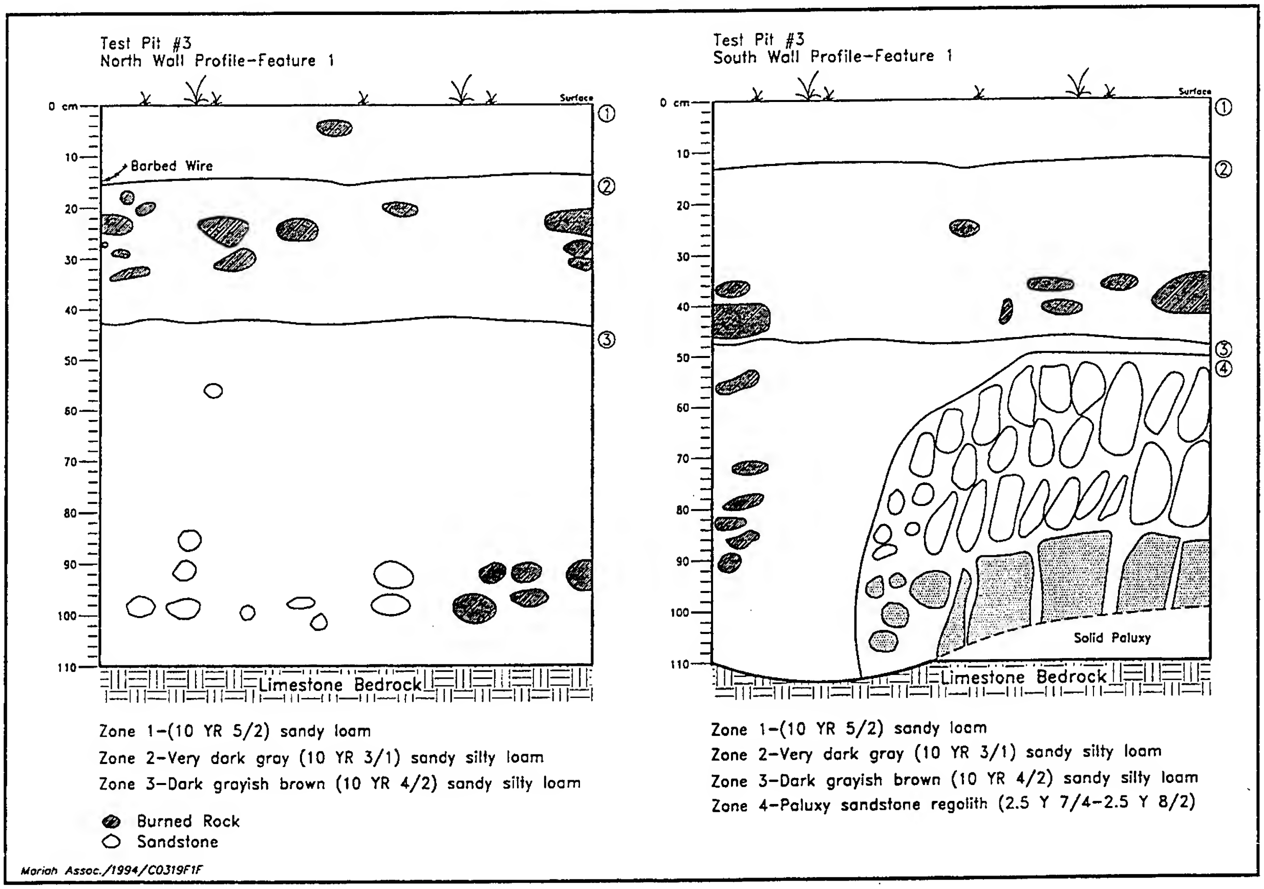

Figure 6.49 Profiles of North and South Walls, TP 3, 41CV319.

zone, which extends from approximately 15 to 48 cmbs. A possible internal hearth was encountered at approximately 40 cmbs along the west wall of TP 3. This possible feature was evidenced by darker fill that contained charcoal and greatly reddened burned rock in comparison to other portions of the unit. No structure was observed in the arrangement of burned rocks, either in the larger feature or presumed internal feature. The absence of observable structure is not surprising given that vertical excavation units appear to be poorly suited for identifying internal structure in large burned rock features (cf. Howard 1991). The third zone in the profile of TP 3 also contained dense burned rock, but the matrix was not as dark as the second zone. The third zone extended from approximately 40 to 108 cmbs, and was composed of a dark grayish brown, sandy, silt loam with burned rock and some charcoal observed in the upper portion. In contrast to the upper 40 cm of TP 3, the third zone also contained a modest snail assemblage. At 50 cmbs in the southwest corner of the TP 3 profile, a fourth zone occurred in the form of Paluxy bedrock in varying stages of decay. The contact between the third and fourth zones sloped rather abruptly from the southwest to the northeast. Thus, the sediments in the third zone lie on top of a sloping Paluxy regolith surface. Limestone bedrock occurred at approximately 110 cmbs in the northwest corner of the unit and underlies both the third and fourth zones. In TP 3, therefore, F 1 appears to occupy a depression in the Paluxy bedrock.

In order to further define the limits of F 1, TP 2 was placed on the eastern portion of F 1, approximately 8 m from TP 3 and across a road that bisects the mound, and excavated to 40 cmbs.

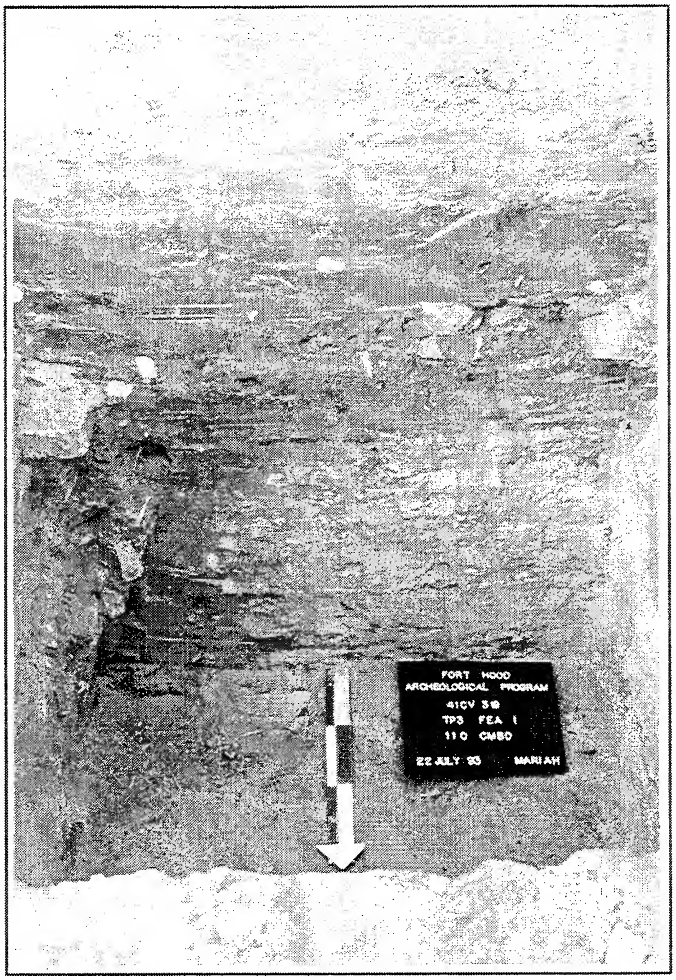

Figure 6.50 Profile of F 1, 41CV319, Looking South.

This unit yielded a much smaller amount of burned rock in the upper 30 cm than TP 3 and was contained in a lighter colored matrix, suggesting that it is situated near the edge of the feature. Other items recovered included a few historic pieces of clear glass from the upper 10 cm and a single lithic from 10 to 20 cmbs. The profile of TP 2 revealed a thin lens of a brown silty clay loam (B horizon) above the weathered Paluxy bedrock, which can also be seen in a road cut just east of the unit.

To further define the extent of F 1, TP 4 was placed 5 m west of TP 3 and excavated to 80 cmbs. The apparent depression in the Paluxy Sand found in TP 3 was also uncovered in TP 4, indicating that this subsurface anomaly may be oriented on a northwest-southeast axis, but does not extend far enough north to be present in the backhoe trench. Test pit 4 did not contain the dark matrix of the main part of F 1 seen in TP 3. Burned rock was recovered from each level excavated and low frequencies of flakes were recovered from 10 to 40 cmbs. A large number of snails was also recovered between 30 to 80 cmbs.

On the basis of profiles in the trench, TP 3, and TP 4, the lower portions of the feature appear to lie in a depression of unknown origin, whereas other, somewhat higher portions of the feature, including the possible internal hearth in TP 3, appear to lie above and outside the depression.

Furthermore, although the culturally modified mound matrix is much darker in color, Zones 1 through 3 in TP 3 appear to correlate with the A horizon and the very top of the AB horizon in the top 20 cm of the trench profile. This implies that these zones may lie within a depression that was excavated into or already existed in the weathered Paluxy substrate. Within TP 3, burned rock counts were low in the upper 20 cm, peaked from 20 to 40 cmbs, and decreased to the base of the feature at 110 cmbs. A total of 461 burned rocks (246 kg) were recovered from TP 3. Within TP 4, burned rock counts were low in the upper 10 cm, increased slightly from 10 to 30 cmbs, and steadily decreased to the base of the feature at 80 cmbs. Within this test pit, a total of 68 burned rocks (totaling 14.25 kg) were recovered. Within TP 2, burned rock counts were low throughout (n=17, 1.75 kg). Chronometric control on the age of the feature is provided by a single AMS radiocarbon age of 990 ± 50 BP (Beta b-71166) on charcoal recovered from TP 3, Level 5. This age suggests that the feature dates to the early portion of the Late Prehistoric period.

Feature 2 is a burned rock concentration eroding from a 30 to 40 cm deep roadcut on the southwest portion of the site. The rock concentration measures approximately 4 m north to south and an unknown distance east to west. Test pit 1 was placed above the roadcut containing F 2 and excavated to bedrock (30 cmbs). A relatively low density of burned rocks (n=20, 3.75 kg) and flakes were recovered from 0 to 20 cmbs. A few pieces of patinated clear glass were also found from the upper 10 cm. No structuring of rock or staining was observed in TP 1 or the road cut. The results of excavation of TP 2 suggest that the feature is highly disturbed and restricted to just below the surface.

Several other burned rock concentrations were located on the site during the testing phase work. However, none appeared to be in reasonable context and they were not investigated further.

Only one tool, a late-stage biface of Cowhouse white chert, was recovered from this site.

A very small assemblage of debitage was recovered from 41CV319. In all, a total of 37 flakes representing three identified chert types and seven indeterminate chert categories were recovered (Table 6.56). Only 19% of the overall assemblage was identified. As a result of the low identification rate and small sample, all three identified types occurred in less than expected frequencies and the indeterminates occurred in greater than expected frequency when the whole assemblage was considered, and all three identified types occurred in expected frequency when the indeterminates were excluded (Table 6.57).

Two of the four chert provinces recognized on base are represented in the recovered material. The North Fort province is represented by Fort Hood Yellow and Fort Hood Gray, while the Cowhouse province is represented by two flakes of Cowhouse Mottled/Banded. The indeterminate suite contains a diverse suite of materials that probably represent a variety of procurement sources. The size distribution of flakes recovered has a modal peak in the 0.9 to 1.2 cm class, but is fairly evenly distributed throughout the size categories (Table 6.56), and roughly 38% of the assemblage consists of cortical flakes that represent an admixture of stream-procured and upland-procured clasts (Table 6.58).

No faunal data was recovered from the site. Although it is possible that the relatively high acidity of the Paluxy substrate and the soil developed thereon resulted in the destruction of bone in the deposit, the presence of snail shells in the matrix suggests that bone was probably never present.

6.6.3 Conclusions and Recommendations

The upper 10 to 15 cm of deposits at the site appear to consist of sediments of historic age. Lithic artifacts recovered from beneath this historic mantle include burned rocks and flakes. Although

flakes were relatively sparse and confined to the upper four levels of deposits on the site, burned rock was recovered from the vast majority of levels excavated. No faunal materials were found during testing, and lithic frequencies were low.

Feature 1 represents a burned rock midden or deflated burned rock mound and appears to have initially accreted in a natural or excavated depression, but also extends above and beyond the limits of the depression. A single radiocarbon age from the feature suggests that it was actively accreting approximately 1,000 years ago, during the early phases of the Late Prehistoric period. The feature apparently contains low amounts of artifacts other than burned rock.

Overall, the debitage assemblage at 41CV319 is unusual and difficult to interpret. Although the site is located a significant distance from a chert source, the flakes vary considerably in size, and a surprising number of decortification flakes are present. The assemblage clearly does not merely represent resharpening of existing tools and/or final stages of tool production, as might be expected at a site removed from a raw material source. However, the low density of debitage indicates that lithic manufacture was not a particularly important activity at the site, even though all stages of manufacture are represented. Moreover, the wide range of materials represented suggests multiple episodes of limited tool production. Thus, it appears that lithic reduction was a recurring, yet relatively unimportant, aspect of cultural activity at the site.

Table 6.56 Debitage Recovery by Size and Material Type, AU 1, 41CV319.

	Size (cm)					
Lithic Material	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types						
08-FH Yellow	0	0	0	3	0	3
14-FH Gray	0	0	0	1	1	2
23-C Mott/Banded	0	0	0	0	2	2
Subtotal	*0*	*0*	*0*	*4*	*3*	*7*
Unidentified Types						
Indet Black	0	0	1	0	0	1
Indet Dk Gray	3	1	1	0	0	5
Indet Lt Brown	2	1	3	1	0	7
Indet Lt Gray	0	4	3	0	0	7
Indet Misc.	0	5	1	1	1	8
Indet Mottled	0	0	0	1	0	1
Indet White	1	0	0	0	0	1
Subtotal	*6*	*11*	*9*	*3*	*1*	*30*
Total	**6**	**11**	**9**	**7**	**4**	**37**

Given that middens are frequently rich in artifactual materials and have been sought as sources of abundant chronology-building data (cf. Black et al. 1992), F 1 apparently represents a relatively unusual behavioral phenomenon, and fits well with other anomalous sites situated on the Paluxy substrate on Fort Hood (Abbott 1994; Abbott et al. 1994). As discussed more fully in

Table 6.57 Binomial Statistic Results, AU 1, 41CV319.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
08-FH Yellow	3	4	15	less	0	5	expected
14-FH Gray	2	4	15	less	0	5	expected
23-C Mott/Banded	2	4	15	less	0	5	expected
Total Indet	30	4	15	more	na	na	na

Chapter 8.0, there are a number of indications that the Paluxy substrate was a preferentially occupied upland locality. There are also indications that prehistoric human activities in the Paluxy context are behaviorally distinct from activities in other contexts, particularly with respect to patterns of burned rock utilization and frequencies of other associated types of cultural material, including lithics and faunal remains (Abbott 1994; Abbott et al. 1994). Still further, another Paluxy site on Fort Hood (41CV595) also has burned rock features associated with a natural or cultural depressions incised into the Paluxy weathering mantle. The association between burned rock features and natural or excavated depressions within the Paluxy outcrop is a currently unsubstantiated, but potentially significant, behavioral phenomenon. Thus, the site represents a good opportunity to investigate the implications of burned rock features in this general setting on Fort Hood. Furthermore, because charcoal is present in the midden, it has the potential to contain botanical and ethnobotanical materials that can inform on the kinds of floral resources that were associated with the formation of middens in this context.

Table 6.58 Debitage Cortex Characteristics by Material Type, AU 1, 41CV319.

	Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types						
08-FH Yellow	1	0	2	0	0	3
14-FH Gray	0	1	1	0	0	2
23-C Mott/Banded	2	0	0	0	0	2
Subtotal	*3*	*1*	*3*	*0*	*0*	7
Unidentified Types						
Indet Black	0	0	1	0	0	1
Indet Dk Gray	1	0	0	4	0	5
Indet Lt Brown	0	0	1	6	0	7
Indet Lt Gray	0	0	0	4	3	7
Indet Misc.	0	1	2	5	0	8
Indet Mottled	0	0	1	0	0	1
Indet White	0	0	0	1	0	1
Subtotal	*1*	*1*	*5*	*#*	*3*	30
Total	**4**	**2**	**8**	**20**	**3**	**37**

Despite the fact that much of the site is heavily damaged, some portions of it are clearly intact. The intact portions therefore have high potential to yield data relevant to a distinct range of burned rock midden variability (Hester 1991) and to technological studies described in the Fort Hood research design (Ellis et al. 1994). The Paluxy context of the site offers a source of geoarcheological data concerning landscape change and paleoenvironmental reconstruction, which also is an important feature of the research design.

On the basis of the above, we judge 41CV319 to be significant and eligible for inclusion in the NRHP by virtue of containing cultural and environmental data that can contribute substantially to the current state of prehistory development for Central Texas in general, and the Fort Hood area in particular. We therefore recommend that the site be avoided and protected to prevent the loss of significant scientific information. Because significant deposits occur in shallowly buried contexts and on the surface immediately adjacent to trails (especially near F 1), portions of the site require measures to protect them against: (1) traffic by tracked and wheeled vehicles, (2) subsurface disturbance by vandalism, and (3) subsurface disturbance by mechanical and manual excavations performed during the course of training exercises.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should

reflect the then-current state of research, which may have progressed since 1993.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 80 m^2 in area, and backhoe trenches. Manual excavations should focus on the areas around F 1. Given an average depth of approximately 65 cm, the total volume of manual excavations would be approximately 52 m^2. Carefully monitored backhoe trenches should be excavated to provide exposures for geoarcheological studies and to elucidate stratigraphic relationships between features.

6.7 SITE 41CV587

6.7.1 Introduction

In late August and early September 1993, Mariah conducted test excavations at site 41CV587. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.7.1.1 Location and Description

Site 41CV587 is located at the confluence of two unnamed tributaries in the upper part of the Two Year Old Creek drainage system. The site is contained in a canyon incised into the margin of the Manning upland. A north-to-south-trending dirt road bisects the site near the western edge (Figure 6.51). A north-to-south oriented gully, approximately 2.5 m deep, is located at the site center (Figure 6.52). A burned rock midden has been exposed on the site. Site 41CV587 also contains a historic component evidenced by surface artifacts and agricultural features including diversion dams and a canal. Overall site dimensions are approximately 120 x 65 m (about 6,500 m^2, or 1.6 acres). For the purposes of this report, the site is included in the Shell Mountain area of the fort.

6.7.1.2 Previous Work

Thomas first recorded the site on 9 November 1983. The site is located at the base of the slope near a draw and was described as consisting of dense organic matrix (greater than 1 m thick) surrounding a mussel shell midden that contained debitage. Possible springs in the area were noted. A portion of the midden was visible due to extensive vandalism (estimated as 50% of the site). The site form noted that this site sparked a discussion of the proximity of middens to permanent alluvial streams and the relationship of middens to changing environments. No site map was drawn.

Hoffman and Dureka again recorded the site on 29 January 1986. They concurred with the possibility of nearby springs and the presence of a shell midden with a depth of more than a meter. In addition, burned rock mounds and scatters were noted. Artifacts included a metate, core, retouched flakes, bifaces, flakes, burned rocks, mussel shell, and a mano. Vandalism, a jeep trail, and erosion were judged to have impacted 50% of the site.

On 30 January 1992, Lintz, Quigg, Oglesby, Frederick, and Abbott revisited and reevaluated the site based on archeological and geomorphological observations. Burned rocks, lithics, mussel shell, and burned bone were noted in a midden deposit that was designated F 1. This material was exposed along the edge of a northwest-to-southeast-oriented drainage located near the base of the colluvial slope. In one exposure, artifacts were observed at least 1 mbs. The midden had been disturbed by the diversion dam construction, vandalism, and runoff caused by rechannelling of the drainage. The site size was enlarged, mainly to the south and east, to include prehistoric and historic material that was observed in an open field and a newly formed, headward-cutting gully. The gully exposure revealed an interfingering of colluvial toeslope material and fine-grained alluvium, about 1.5 m thick. Springs were noted upstream on a tributary, including onw historic water empondment feature.

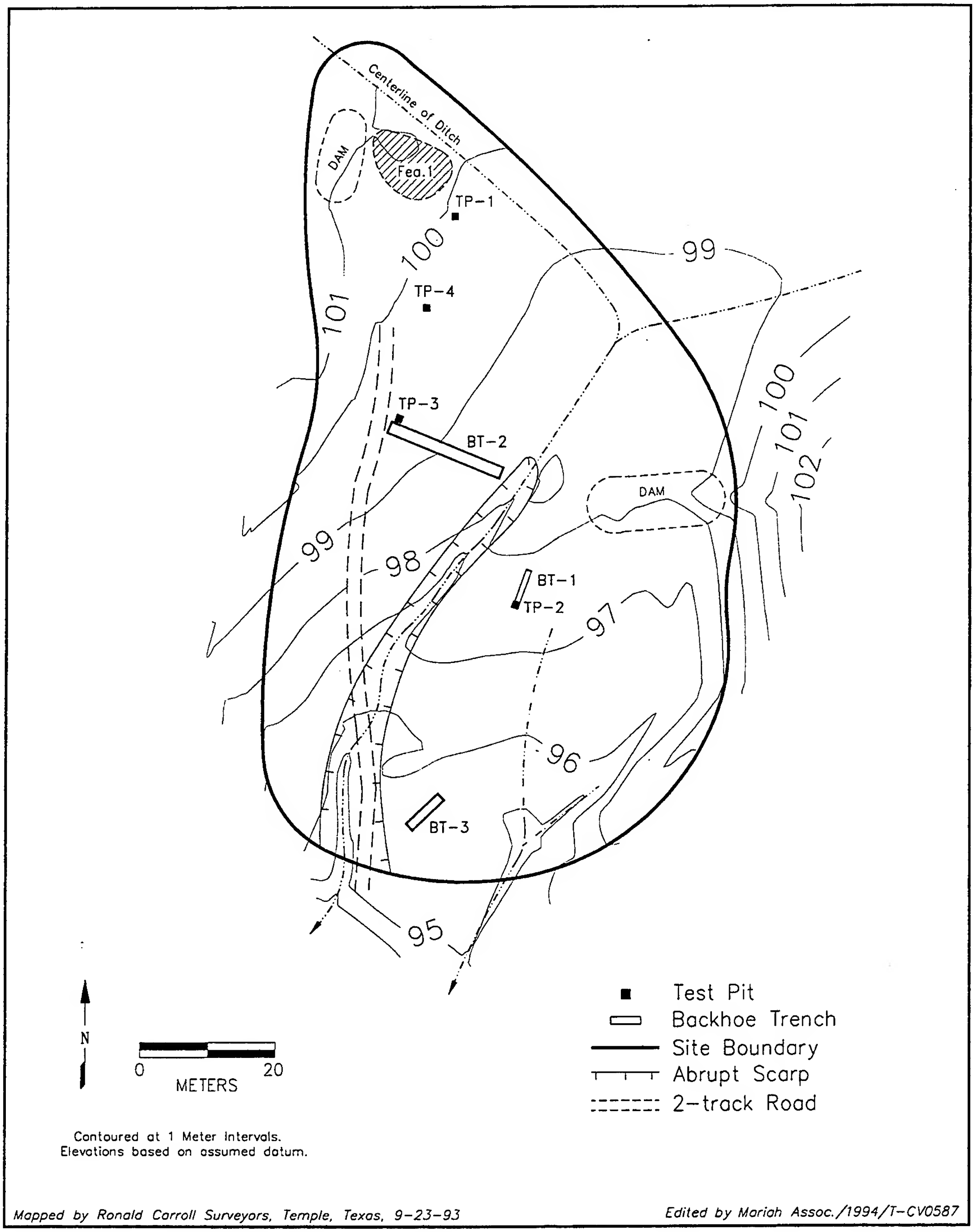

Figure 6.51 Site Map of 41CV587.

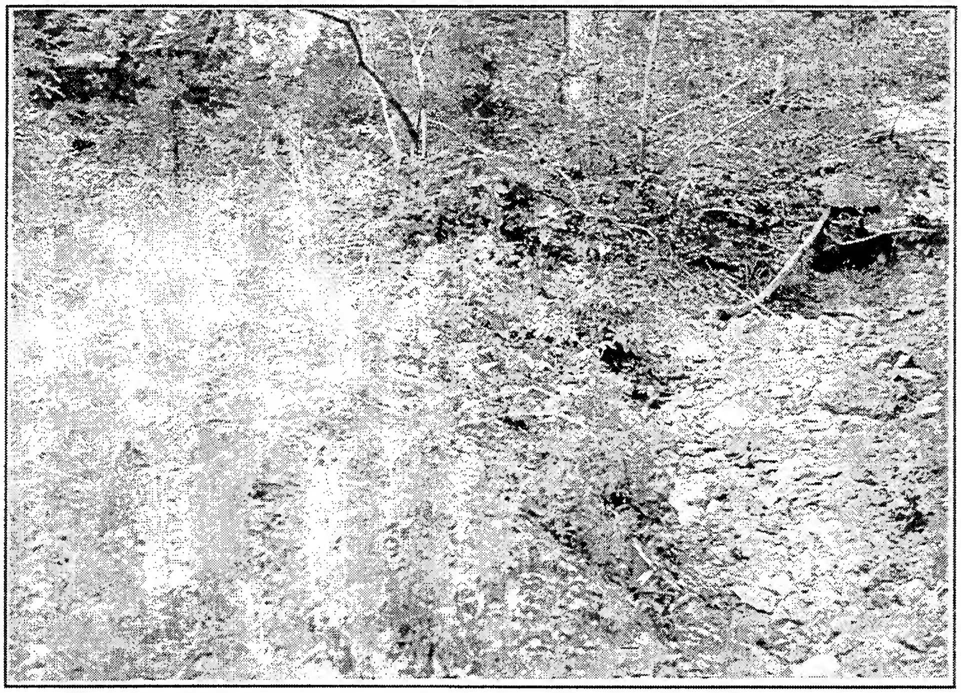

Figure 6.52 Overview of Site 41CV587, Looking Northeast.

Five shovel tests were excavated on 13 March 1992 to assess the presence of intact cultural deposits. Four of these were dug in the open field and the fifth within the midden deposit adjacent to the diversion dam. Most were excavated 40 to 50 cmbs. Two tests contained only historic material, and one test was completely sterile. One test placed at the eastern site edge contained lithics and burned rocks from 10 to 40 cmbs in a dark matrix containing rocks. The other positive test, excavated to 45 cmbs, was located in the midden. Bone, mussel shell, burned rocks, and lithics were recovered from 0 to 45 cmbs. Based on testing results, the NRHP eligibility of the site was uncertain, and further testing was recommended. Three backhoe trenches and three 1 x 1 m manually excavated test pits were recommended, along with collection and analysis of specific samples (Trierweiler 1994:A958-A960).

6.7.1.3 New Work

Three backhoe trenches (BTs 1-3) and four 1 x 1 m test pits (TP s 1-4) were excavated (Table 6.59). Trench 1 was positioned on the medial floodplain on the upstream end of the site, and BT 3 was in a similar position on the downstream end. These two trenches were relatively short excavations designed to provide a vertical window through the deposits in the valley axis. The third trench (BT 2) was a much longer trench that extended from the distal edge of the floodplain up the colluvial apron flanking the valley walls, and was designed to examine the lateral variability resulting from the juxtaposition of floodplain and channel sediments in the valley axis and fan sediments on the valley margin. Two test pits (TPs 2 and 3) were offset from BT 1 and BT 2, respectively, and an additional two test pits (TPs 1 and 4) were excavated as isolated units. Recovered cultural material is summarized in Table 6.60.

6.7.2 Results

All four tests pits excavated on this site contained cultural material, either buried in situ or redeposited. Test pits 1 and 3 both confirmed the presence of intact features and deposits.
Trench 1 was placed at the eastern edge of the site. Two depositional units were revealed in the profile. The upper 110 cm consists of very poorly sorted, gravelly clay loam representing colluvial/fan deposition, while the lower 140 cm of the exposure revealed a thick deposit of graded, gravelly clay representing deposition by the stream. Each of these two units supports a moderately developed soil. The upper colluvial unit exhibits an A-Bw-Bk profile. The A horizon is 30 cm thick and consists of diverse angular limestone gravels up to 10 to 15 cm in diameter in a dark gray clay loam matrix. The gravels show a combination of clast and matrix support, and the fines contain common woody roots and exhibit a strong granular structure. This horizon grades into a texturally similar, very dark gray Bw horizon, 25 cm thick. Granular structure is present, but is less developed than in the overlying A horizon, and the number of woody roots is strongly reduced. Although a few carbonate films and filaments are apparent, they are not common enough to indicate significant illuvial carbonate. No clay films are present. The Bw horizon grades into a texturally similar, dark grayish brown Bk horizon, 55 cm thick. The fine-grained matrix is massive and contains abundant carbonate filaments and dispersed matrix carbonate. There is some evidence of incipient dissolution of framework clasts, and flecks of charcoal are dispersed throughout the matrix.

The underlying alluvial unit in BT 1 is separated from the overlying colluvium by a clear, smooth boundary. The underlying unit exhibits an Ab-Bwb profile. The Ab horizon is 30 cm thick and consists of very dark gray, gravelly clay exhibiting a weak, fine, subangular blocky structure. The gravels incorporated into the unit are primarily matrix supported and rarely exceed 1 cm in diameter. Many of the clasts show evidence of in situ dissolution, resulting in pockets of carbonate-rich sediment around many of the larger clasts. The underlying Bwb horizon is a dark brown, gravelly clay loam approximately 15 cm thick. It exhibits a fine, angular, blocky structure and the same type of carbonate aureolae around gravels as the Ab horizon. Although a few thin films are present, this morphology suggests that dissolution of the skeletal clasts is occurring under saturated conditions rather than through the action of infiltrating water in the vadose zone. The basal horizon is a massive, yellowish brown, gravelly, sandy clay that fines upward from poorly sorted gravels up to 10 to 15 cm in diameter to sandy pea-gravel in a clay matrix. The horizon shows some oxidation and the same type of carbonate clouds as the overlying solum, suggesting alternating periods of saturation and low water content. At the time that the trenches were excavated, the sediment column was only slightly moist.

Table 6.59 List of Treatment Units, 41CV587.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	7	.08	220
1	BT 2	16	.08	200
1	BT 3	8	.08	220
1	TP 1	1.0	1.0	200
1	TP 2	1.0	1.0	180
1	TP 3	1.0	1.0	50
1	TP 4	1.0	1.0	180

Test pit 2, excavated to 180 cmbs, was offset from the southeast corner of BT 1. The test pit contained low frequencies of lithics and/or burned rocks in each level excavated from 0 to 170 cmbs, with no cultural material found in Level 18. Beginning with Level 9 and continuing through Level 15, the matrix consists of a greater percentage of fine-grained material (presumably alluvium), whereas all other levels consist of coarse material that is presumed to be colluvium in Levels 1 through 8, and a mix of channel

Table 6.60 Artifact Recovery by Test Pit, 41CV587.

	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	3	25	2	15(1.5)	0	0	2	0	3(0.2)	0	5	58	0	40(4)	0	3	6	0	8(1)
2	0	5	53	0	29(4.5)	0	0	0	1	0(0)	1	16	333	2	55(29)	0	2	7	0	2(2)
3	0	1	6	0	25(4.5)	0	0	3	0	1(0.1)	0	8	43	1	114(38.5)	0	0	1	0	0(0)
4	0	1	10	1	17(10)	0	0	10	0	0(0)	0	0	0	0	20(5)	0	0	4	0	0(0)
5	0	42	217	13	33(1.5)	0	0	3	2	3(2)	0	0	0	0	0(0)	0	0	0	0	0(0)
6	4	33	499	15	74(5.5)	0	0	6	0	5(0.8)						0	0	0	0	0(0)
7	3	29	263	10	64(15)	0	0	3	0	3(0.5)						0	0	4	0	0(0)
8	0	16	178	7	76(23.5)	0	0	4	1	3(0.3)						0	13	20	0	3(1)
9	12	24	235	6	213(44)	0	0	5	0	0(0)						0	0	17	0	3(0.5)
10	6	35	267	4	186(27)	0	0	3	0	0(0)						0	0	25	1	3(0.3)
11	0	4	60	2	34(4)	0	0	15	1	3(0.5)						0	0	16	1	2(0.5)
12	0	0	7	0	14(2)	0	0	3	0	0(0)						1	0	8	0	2(0.5)
13	0	0	4	0	1(0.3)	0	0	4	1	0(0)						0	2	17	0	0(0)
14	0	0	8	0	0(0)	0	0	5	0	0(0)						0	0	6	0	1(0.3)
15	0	0	0	0	1(0.3)	0	0	6	0	1(0.5)						0	0	5	0	1(0.3)
16	0	0	7	0	4(1)	0	0	5	0	1(0.2)						0	0	9	0	0(0)
17	0	0	3	0	4(1.3)	0	0	3	0	0(0)						0	0	6	0	0(0)
18	0	0	0	0	1(0.3)	0	0	0	0	0(0)						0	0	7	0	0(0)
19	0	0	1	0	0(0)															
20	0	0	0	0	0(0)															
TOTAL	25	193	1843	60	791(146.2)	0	0	80	6	23(5.1)	1	29	434	3	229(76.5)	1	20	158	2	25(6.4)

sediments and colluvium below Level 15. Judging from the high degree of colluvial deposition and the absence of vertical separation of artifacts that would suggest discrete occupations, most of the material appears to be redeposited.

Trench 2 extended from the floodplain up the colluvial toeslope on the western side of the valley. It revealed a complex sequence of deposits representing interfingering of alluvium from the channel and colluvium from the valley wall. The zones described below reflect this complex architecture and do not represent a single stacked column (Figure 6.53). Zone 1 consists of a thin (about 10 cm) wash of dark gray, clayey gravel to gravelly clay loam that mantles the entire surface, and represents recent (historic) sedimentation on an erosional surface. Zone 2 represents the A horizon buried by this wash of material and consists of dark to very dark gray, gravelly clay loam that grades from massive downslope to strongly prismatic upslope. It varies from approximately 20 to 50 cm in thickness. Zone 3 consists of dark gray, gravelly clay loam alluvium deposited in the valley axis, and wedges out upslope on the fan. The deposit contains a number of wide, shallow secondary channels floored with clast-supported limestone gravels. Zone 4 is a locally preserved remnant of a well developed Bt horizon formed on older alluvial and colluvial deposits. It consists of dark brown, gravelly clay loam and exhibits a very strong medium prismatic structure. Zone 5 consists of a wedge of massive, dark brown, gravelly clay loam in the valley axis. It appears to represent, in large part, colluvial material eroded from the soil formed on the sloping surface (i.e., Zone 4). Zone 6 consists of weakly bedded loamy gravel colluvium that underlies the soil remnant. The gravels are typically less than 1 cm in diameter and are variously clast and matrix supported. Zone 7 consists of a localized zone of strong carbonate cementation in the top of this deposit. It is pinkish gray and shows signs of incipient formation of a laminar calcrete at the contact with Zone 6. Zone 8 consists of a thick wedge of ancient gravelly loam colluvium showing moderate to strong diagenetic alteration. The unit contains abundant dispersed matrix carbonate, giving it a light brown color.

Test pit 3, excavated to 50 cmbs, was offset from the northwest corner of BT 2 to investigate burned rock exposed at the west end of the trench. This rock proved to be a large, basin-shaped hearth which was designated F 2 (Figure 6.54). The feature consists of an amorphous burned rock concentration across the entire unit in Levels 1 and 2. Historic artifacts and unburned limestone clasts

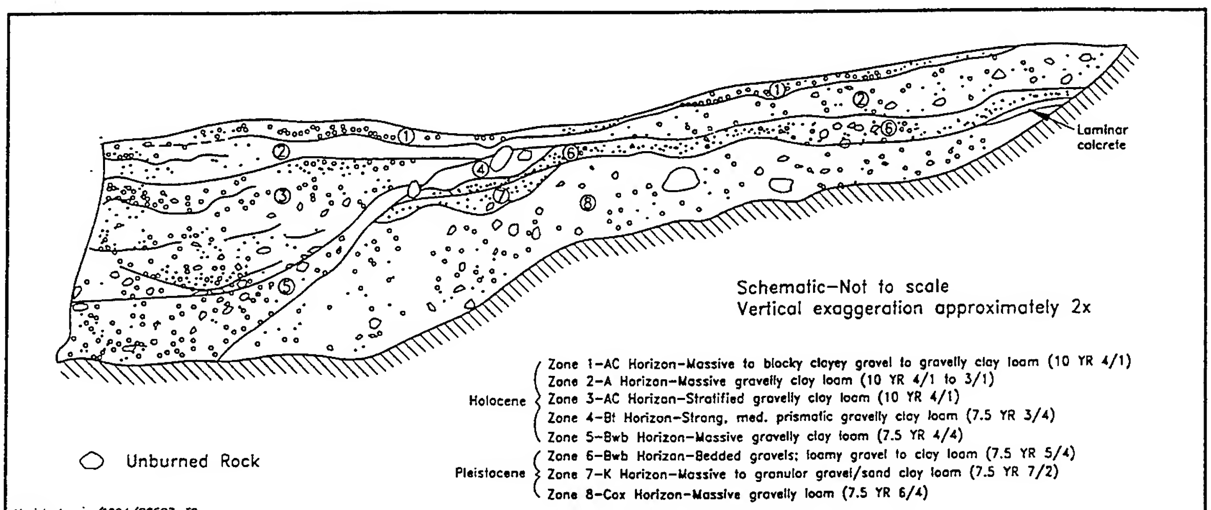

Figure 6.53 Schematic Profile of BT 2, 41CV587.

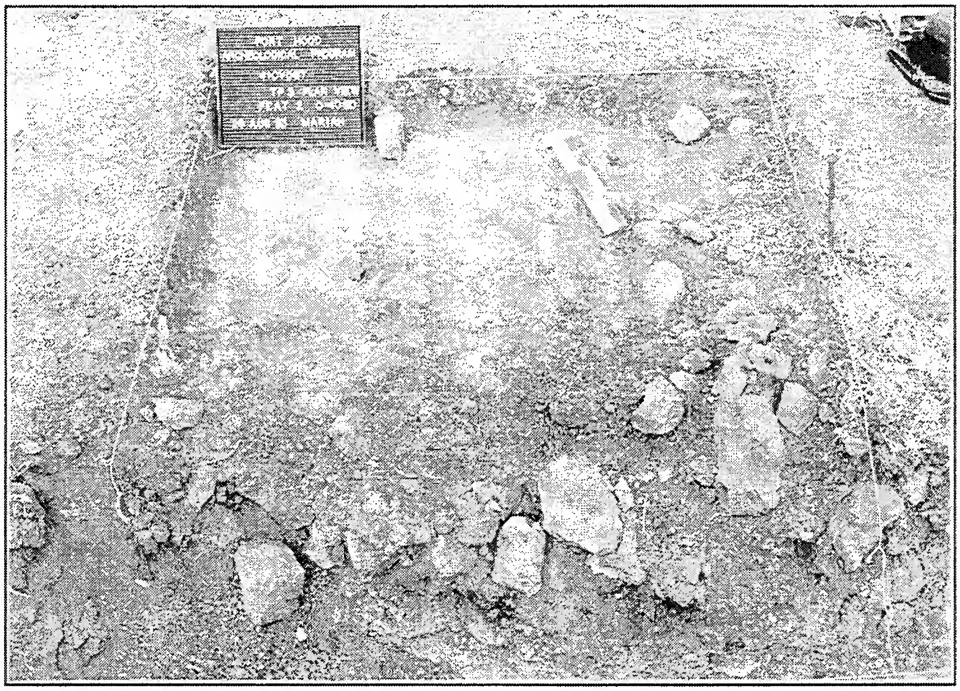

Figure 6.54 Planview of F 2, 41CV587, Looking North.

of probable colluvial origin were intermixed with lithics, burned rocks (n=40, 4 kg), and bone in Level 1. Charcoal, burned rocks (n=55, 29 kg), debitage, bone, mussel shell, and two Ensor points were recovered from Level 2 and appear to be directly associated with the feature. Approximately 10% of the fill in this level was gravel, and it is interpreted as colluvium. Near the top of Level 3, a semicircular remnant of a basin-shaped hearth (largely destroyed by the backhoe trench and possible plowing of the cleared surface) was encountered along the southern half of the test pit. The hearth was composed of 114 burned rocks (38.5 kg), ranging in size from less than 1 cm to 15 cm in diameter. Dense charcoal, numerous lithics, and a few burned bones and mussel shells were recovered from the feature, which extended to a depth of 36 cmbs. The feature fill was a dark gray clay loam, and contrasted strongly with the gravelly, tan, clay loam outside the feature. At 30 cmbs, the hearth measured 30 x 68 cm. All feature matrix from 30 to 36 cmbs was collected for flotation. A radiocarbon age of 260 ± 70 BP (Beta-74467) was obtained from charcoal collected from Level 3. High frequencies of flakes, several bone fragments, and a few mussel shells were recovered from the feature. No cultural material was found in the gravelly clay loam below F 2.

Trench 3 was placed at the southern end of the site on the alluvial terrace. The profile in BT 3 consisted of 2.5 m of gravelly clay loam containing subhorizontal stringers of gravel situated on the alluvial surface near the downstream site boundary. The deposit represents deposition on the floodplain punctuated by occasional washes of overbank coarse material during floods. A thick A-AB-BC-Cox profile is developed in the deposits. The A horizon is 30 cm thick and consists of very gravelly black clay loam with a strong granular structure and abundant woody roots. The AB horizon is 80 cm thick, very dark gray, strongly granular, and contains a few fine films and filaments of carbonate. The BC horizon is 60 cm thick, a dark grayish brown gravelly clay loam,

and contains fewer gravels and more sands than the overlying and underlying horizons. A few fine carbonate filaments are dispersed through the matrix, which grades from weak granular to massive with depth. The Cox horizon is 80 cm thick and consists of fine to medium gravels in a dense massive clay matrix. The horizon is lightly oxidized and contains faint coarse mottles.

Test pit 1 was placed on F 1, approximately 4 m south of the tributary channel in the pecan grove, and was excavated to a depth of 200 cmbs. F 1 was encountered from 0 to 110 cmbs in TP 1. The upper 50 cm of deposit has been disturbed by historic activities and colluvial mixing (as evidenced by high rock and gravel density containing historic artifacts). Within TP 1, a dramatic increase in lithic frequency, from about 20 to more than 200 per level, and a concomitant decrease in the frequency of unburned limestone clasts occurred in Level 5. The sealed, intact portion of the midden occurred from 50 to 110 cmbs (Levels 6 to 11) and contained the highest amounts of burned rock, mussel shell, snails, lithics, and bone recovered from the unit. A total of 617 angular to subangular burned rocks (119 kg), measuring up to 20 x 15 cm in size, were recovered from these levels. No internal patterning of the rock was discernable, although an apparent peak in rock density occurred from 80 to 100 cmbs. Several projectile points were also recovered from the feature. These points temporally range from the Late Prehistoric through the Transitional Archaic, and occur in chronological order in the stratigraphy. The matrix in Levels 6 to 11 consists of a fine-grained alluvial fill, as opposed to the colluvium noted in preceding levels. High densities of flakes and several bone fragments and mussel shells were also recovered from the feature from 50 to 110 cmbs.

Below F 1, artifact frequencies decreased dramatically from 110 to 120 cmbs. A further decrease in cultural material and an increase in rock/gravel content begins in Level 12 and continues through Level 19. No artifacts were recovered from Level 20.

Test pit 4, excavated to 180 cmbs, was placed roughly halfway between TP 1 and TP 3 to help identify possible differences in deposition and character of Fs 1 and 2. From 0 to 70 cmbs, the profile of TP 4 consisted of a stony deposit of probable colluvial origin. Low densities of burned rocks, lithics, and bone fragments were recovered from these levels. Levels 1 and 2 also contained historic material. Level 8 still contained a fair amount of rocks and gravels; however, an obvious increase in artifact frequency occurred. This increased density continued to 130 cmbs, and the artifact assemblage included an Ensor point recovered from Level 11. In addition to a decrease of cultural material, the matrix changes from coarse-grained colluvium to fine-grained alluvium at approximately 130 cmbs. At the base of Level 12, a very gravelly, brown clay loam was detected in the southwest quadrant, while the matrix across the remainder of the unit remained a dark gray-brown clay loam. With depth, the brown, gravelly fill encroached north and east and eventually comprised 80% of the unit at 150 cmbs. At 160 cmbs, bedrock was encountered across one-third of the unit, with the brown deposit covering 60% and the darker soil less than 10% of the test pit. Excavation was halted at this point. Although cultural material was found to 160 cmbs, contextual integrity is dubious for materials below 130 cmbs.

All but two of the projectile points from this site are associated with either Fs 1 or 2 (Table 6.61). A Transitional Archaic Frio dart point was recovered from BT 2 and an Ensor was recovered from TP 4. Feature 1 resulting in 10 points were in near perfect stratigraphic order from the Late Prehistoric to the Transitional Archaic (Table 6.62). Feature 2 resulted in two Ensor dart points. The Southeast Range materials are 80% of the identified chert types; however, indeterminate cherts are 64% of the total assemblage. The general nondebitage lithic assemblage includes a crushing/abrading implement, two multiple platform cores, and 71 chipped stone tools of various types (Table 6.63). These include the full range of bifacial reduction and a large proportion

Table 6.61 Projectile Points, AU 1, 41CV587.

Point Type	Lithic Material								Total
	06-HL Tan	08-FH Yellow	Indet Black	Indet Dk Brown	Indet Dk Gray	Indet Lt Brown	Indet Mottled	Indet Trans	
Bulbar Stemmed	0	0	0	0	0	0	1	0	1
Darl	0	0	0	0	0	0	0	1	1
Edgewood	0	0	0	1	0	0	0	0	1
Ensor	1	0	0	1	0	0	0	0	3
Frio	0	0	1	0	0	0	0	0	1
Other Dart	1	0	0	0	0	0	0	0	1
Scallorn	1	1	0	0	1	2	0	0	6
Total	**4**	**1**	**1**	**2**	**1**	**3**	**1**	**1**	**14**

of unifacially modified tools. Seventeen different chert varieties are present with high percentages of Indeterminate Light Brown (32%) and Heiner Lake Tan (19%).

One indeterminate bone tool, identified to the Mammalian Class, was recovered from Test Pit 1, Level 7.

Debitage representing thirteen identified chert types, nine indeterminate categories, and quartz was recovered from the site (Table 6.64). Roughly 15% of the overall assemblage was identified. When the entire assemblage was considered, Fort Hood Yellow and the aggregate indeterminates occurred in greater than expected frequency, while the remainder of identified types occurred in less than expected frequency. When the indeterminates were excluded, Fort Hood Yellow occurred in greater than expected frequency, Cowhouse Dark Gray occurred in expected frequency, and the remainder of identified types occurred in less than expected frequency (Table 6.65).

All four identified chert provinces are represented in the assemblage, but the North Fort province is strongly dominant due solely to the overwhelming contribution of Fort Hood Yellow, which comprises 68% of the identified total. Overall, the North Fort Province is represented by four types that comprise 78% of the identified total, the Southeast Range province by four types comprising 10%, the West Fort province by one type comprising 3%, and the Cowhouse province by

Table 6.62 Projectile Points by Level, AU 1, 41CV587.

Level	Point Type					Total
	Bulbar Stemmed	Darl	Edgewood	Other Dart	Scallorn	
6	1	0	0	0	3	4
7	0	0	0	0	1	1
8	0	0	1	1	2	4
9	0	1	0	0	0	1
Total	**1**	**1**	**1**	**1**	**6**	**10**

Table 6.63 Lithic Tools, AU 1, 41CV587.

	Core Type	Tool Type												
Lithic Material	multiple platform	Chopper	Crushing/Battering	early stage biface	edge-modified	end scraper	late stage biface	middle stage biface	other tool	preform	side scraper	uniface	utilized flake	Total
02-C White	0	0	0	0	0	0	1	0	0	0	0	0	0	1
03-AM Gray	0	0	0	0	0	0	0	2	0	0	0	0	0	2
06-HL Tan	1	0	2	1	0	0	2	1	1	1	1	0	4	14
08-FH Yellow	0	0	0	0	0	0	2	0	0	1	0	0	0	3
13-ER Flecked	0	0	0	0	0	0	0	0	0	1	0	0	0	1
15-Gry/Brn/Grn	0	0	0	0	0	0	1	0	0	0	0	0	1	2
17-Owl Crk Black	0	0	0	1	0	0	1	0	0	0	0	0	0	2
18-C Mottled	1	0	0	0	0	0	0	1	0	0	0	0	0	2
19-C Dr Gray	0	0	0	0	0	0	0	0	0	0	1	0	0	1
22-C Mott/Flecks	0	0	0	0	0	0	0	0	0	0	0	1	0	1
23-C Mott/Banded	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Indet Dk Brown	0	0	0	0	0	0	3	0	0	1	1	1	0	6
Indet Dk Gray	0	0	0	0	0	0	1	2	0	1	0	0	1	5
Indet Lt Brown	0	0	0	1	1	2	5	2	0	1	0	3	9	24
Indet Lt Gray	0	0	0	0	0	0	1	0	0	1	0	1	4	7
Indet Mottled	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Indet White	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Total	2	1	2	3	1	2	17	9	1	8	3	6	19	74

four types comprising 9% of the identified total. Indeterminates are overwhelmingly dominated by light brown varieties, suggesting that Fort Hood yellow may be present in numbers larger than indicated by the identified suite.

The majority of recovered flakes (80%) are smaller than 1.2 cm. This, coupled with the overwhelming proportion of decortified flakes (92% of the total), suggests that latter-stage reduction is dominated at the site. Of those flakes exhibiting cortex, 16% exhibit cortical abrasion indicative of stream transport, 10% clearly lack such abrasion, and 73% are indeterminate (Table 6.66).

A moderate faunal record, consisting almost exclusively of deer, bison, and indeterminate bison- and deer-sized animals was recovered from the site (Table 6.67). The only exception to this preponderance of large game was one cervical vertebra from a turkey-sized bird and mussel shell representing a minimum of three distinct species, none of which is likely to occur in the small streams around the site, implying procurement in the Cowhouse Creek valley.

6.7.3 Conclusions and Recommendations

The temporal context of the deposits revealed in the backhoe trenches is unclear. The degree of pedogenesis and diagenesis evident suggests that the alluvial and colluvial deposits in the valley axis are probably of Holocene age, while the core of the colluvial apron is clearly Pleistocene in age. The presence of Ensor points in a feature buried by colluvium and beneath the colluvium deposits themselves indicates that colluvial processes were active during or after the Transitional Archaic, while the burial of the Protohistoric feature in colluvial deposits indicates that active colluviation continued, albeit episodically, into the Historic period.

The deposits in this small, transitional upland valley can not be readily correlated with the alluvial sequence for Fort Hood developed by Nordt (1992), and further data are required to refine the temporal interpretation. Although there have been substantial impacts to portions of the site, intact midden deposits and buried features remain. It is possible that F 1 is an extensive burned rock midden that extends at least as far as the area between TPs 1 and 4.

The chert debitage on the site suggests that while most of the identified material represents the North Fort province, a variety of materials from as far afield as the Southeast Range (some 29 km to the southeast) are represented. The faunal record is dominated by relatively large animals, including deer and bison.

Given the presence of abundant, temporally diagnostic artifacts, chronometrically datable materials, and subsistence remains, this site has considerable potential to address a series of issues outlined in the Fort Hood research design (Ellis et al. 1994). The availability of chronometrically datable material in feature context with known relationships to colluvial and alluvial events at the site implies that there is high potential to address paleotopographic and paleoenvironmental issues. The artifact assemblage, together with faunal and (probably) ethnobotanical assemblages implies that the site has high potential to provide data for technological studies described in Ellis (1994a). The conjunction of abundant, chronometrically datable materials and diagnostic projectile points implies that the site has high potential to provide a data base for refining the chronology of temporal diagnostics in the Fort Hood area.

Table 6.64 Debitage Recovery by Size and Material Type, AU 1, 41CV587.

	Size (cm)						
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types							
03-AM Gray	0	4	6	0	1	0	11
06-HL Tan	0	0	6	5	2	2	15
07-Foss Pale Brown	0	0	1	4	2	1	8
08-FH Yellow	22	105	56	54	13	1	251
09-HL Tr Brown	0	0	0	3	2	0	5
10-HL Blue	0	3	1	2	1	0	7
13-ER Flecked	0	3	2	3	0	0	8
14-FH Gray	0	2	6	2	1	0	11
15-Gry/Brn/Grn	0	1	5	3	4	2	15
17-Owl Crk Black	0	5	2	4	0	0	11
18-C Mottled	0	0	0	0	0	1	1
19-C Dr Gray	0	12	4	7	2	0	25
23-C Mott/Banded	0	0	0	0	1	0	1
Subtotal	*22*	*135*	*89*	*87*	*29*	*7*	*369*
Unidentified Types							
Indet Black	11	7	0	0	0	0	18
Indet Dk Brown	39	97	46	28	8	3	221
Indet Dk Gray	0	11	6	5	0	0	22
Indet Lt Brown	251	715	366	210	75	25	1642
Indet Lt Gray	20	110	35	13	2	0	180
Indet Misc.	0	1	1	1	0	0	3
Indet Mott.	0	0	0	0	1	0	1
Indet Trans	0	2	0	0	0	0	2
Indet White	5	34	18	8	2	0	67
Subtotal	*326*	*977*	*472*	*265*	*88*	*28*	*2156*
Quartz	0	1	1	0	0	0	2
Total	**348**	**1113**	**562**	**352**	**117**	**35**	**2527**

Table 6.65 Binomial Statistic Results, AU 1, 41CV587.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
03-AM Gray	11	145	194	less	18	39	less
06-HL Tan	15	145	194	less	18	39	less
07-Foss Pale Brown	8	145	194	less	18	39	less
08-FH Yellow	251	145	194	more	18	39	more
09-HL Tr Brown	5	145	194	less	18	39	less
10-HL Blue	7	145	194	less	18	39	less
13-ER Flecked	8	145	194	less	18	39	less
14-FH Gray	11	145	194	less	18	39	less
15-Gry/Brn/Grn	15	145	194	less	18	39	less
17-Owl Crk Black	11	145	194	less	18	39	less
18-C Mottled	1	145	194	less	18	39	less
19-C Dr Gray	25	145	194	less	18	39	expected
23-C Mott/Banded	1	145	194	less	18	39	less
Quartz	2	145	194	less	18	39	less
Total Indet	2156	145	194	more	na	na	na

On this basis, site 41CV587 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the known eligible components are shallowly buried and, in some places, adjacent to active channels, they are subject to damage by erosion and by vehicles. There is evidence of fairly widespread vandalism at this site and at nearby sites. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, (2) prevent mechanical or manual excavations by military personnel, (3) minimize the impact of further erosion on the cutbank, and (4) minimize vehicular damage.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 125 m^2 in area. A substantial portion of the block excavations should be focused on the area around TP 1, TP 3, and TP 4, and should be directed toward data recovery from surfaces adjacent to features as well as features themselves. Given that the average depth of known occupations is approximately 150 cm, total volume of manual excavations is approximately 188 m^2. Although carefully monitored, mechanically excavated trenches should be used to provide exposures for geoarcheological studies and for stratigraphic correlation of occupations, machinery should not be used to remove overburden because intact deposits are shallowly buried.

Table 6.66 Debitage Cortex Characteristics by Material Type, AU 1, 41CV587.

	All Cortex			Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types									
03-AM Gray	0	0	0	0	0	1	10	0	11
06-HL Tan	0	0	0	2	0	0	13	0	15
07-Foss Pale Brown	0	0	0	1	1	1	5	0	8
08-FH Yellow	0	0	0	2	0	20	229	0	251
09-HL Tr Brown	0	0	0	0	0	1	4	0	5
10-HL Blue	0	0	0	0	0	1	6	0	7
13-ER Flecked	0	0	0	0	0	0	8	0	8
14-FH Gray	0	0	0	0	0	0	11	0	11
15-Gry/Brn/Grn	0	0	0	1	0	2	12	0	15
17-Owl Crk Black	0	0	0	1	0	3	7	0	11
18-C Mottled	0	0	0	1	0	0	0	0	1
19-C Dr Gray	0	0	0	0	0	0	25	0	25
23-C Mott/Banded	0	0	0	0	0	1	0	0	1
Quartz	0	0	0	0	0	1	1	0	2
Subtotal	*0*	*0*	*0*	*8*	*1*	*31*	*331*	*0*	*371*
Unidentified Types									
Indet Black	0	0	0	0	0	0	18	0	18
Indet Dk Brown	0	0	0	0	1	17	203	0	221
Indet Dk Gray	0	0	0	0	0	0	21	1	22
Indet Lt Brown	1	2	0	20	15	87	1517	0	1642
Indet Lt Gray	0	0	0	2	1	5	172	0	180
Indet Misc.	0	0	0	1	0	0	2	0	3
Indet Mott.	0	0	0	0	0	0	1	0	1
Indet Trans	0	0	0	0	0	0	2	0	2
Indet White	0	0	1	0	0	3	63	0	67
Subtotal	*1*	*2*	*1*	*23*	*17*	*112*	*1999*	*1*	*2156*
Total	**1**	**2**	**1**	**31**	**18**	**143**	**2330**	**1**	**2527**

Table 6.67 Faunal Recovery, AU 1, 41CV587.

	Element																						
Vertebrates	Astragalus	Cervical Vertebra	Cranium	Distal phalange	Femur	Fused 2&3rd carpal	Fused 3&4th metata	Humerus	Indeterminate	Long bone	Middle phalange	Pelvis	Permanent tooth	Proximal Phalange	Radius	Rib	Scapula	Tooth	Ulna	Vertebra	left	right	Total
Artiodactyla	2	0	0	1	1	1	2	2	0	0	0	1	0	1	1	0	1	0	1	0	0	0	14
Aves (large)	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Bos/Bison	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3
Mammalia (lg/vlg)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	2
Mammalia (med/lg)	0	0	1	0	0	0	0	0	171	0	0	0	0	0	0	2	0	0	0	5	0	0	179
Mammalia (sm/med)	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Odocoileus sp.	0	0	0	0	0	0	0	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	4
Vertebrata	0	0	0	0	0	0	0	0	36	1	0	0	0	0	0	0	0	0	0	0	0	0	37
Total	**2**	**1**	**2**	**1**	**1**	**1**	**2**	**4**	**209**	**1**	**1**	**1**	**4**	**1**	**1**	**2**	**1**	**1**	**1**	**5**	**0**	**0**	**242**
Bivalves																							
Lampsilis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Quadrula apiculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Toxolasma sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**4**

6.8 SITE 41CV595

6.8.1 Introduction

In August 1993, Mariah conducted test excavations at site 41CV595. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.8.1.1 Location and Description

41CV595 is located on an upland surface and within a Paluxy sand deposit, the extent of which defines the site boundaries (Figure 6.55). A gravel road passes near the northern site boundary, and a major tank trail runs parallel to the road, within the site boundaries (Figure 6.56). Tank and vehicle trails criss-cross the remainder of the site. The site contains burned rock midden deposits. Maximum site dimensions are 130 x 125 m (about 16,250 m^2, or 4 acres). For the purposes of this report, 41CV595 is located in the Stampede area of the fort.

6.8.1.2 Previous Work

This site was initially recorded by Mesrobian and Michaels on 25 April 1985 as a possible campsite. Several dart points, ranging in presumed age from Middle to Transitional Archaic, as well as a hammerstone, were collected. A moderate density of debitage, a few bifaces, a mano, a burned rock mound, and a possible hearth were observed. The site was estimated to have 50 cm of a dark brown loam deposit. The site was also estimated to be

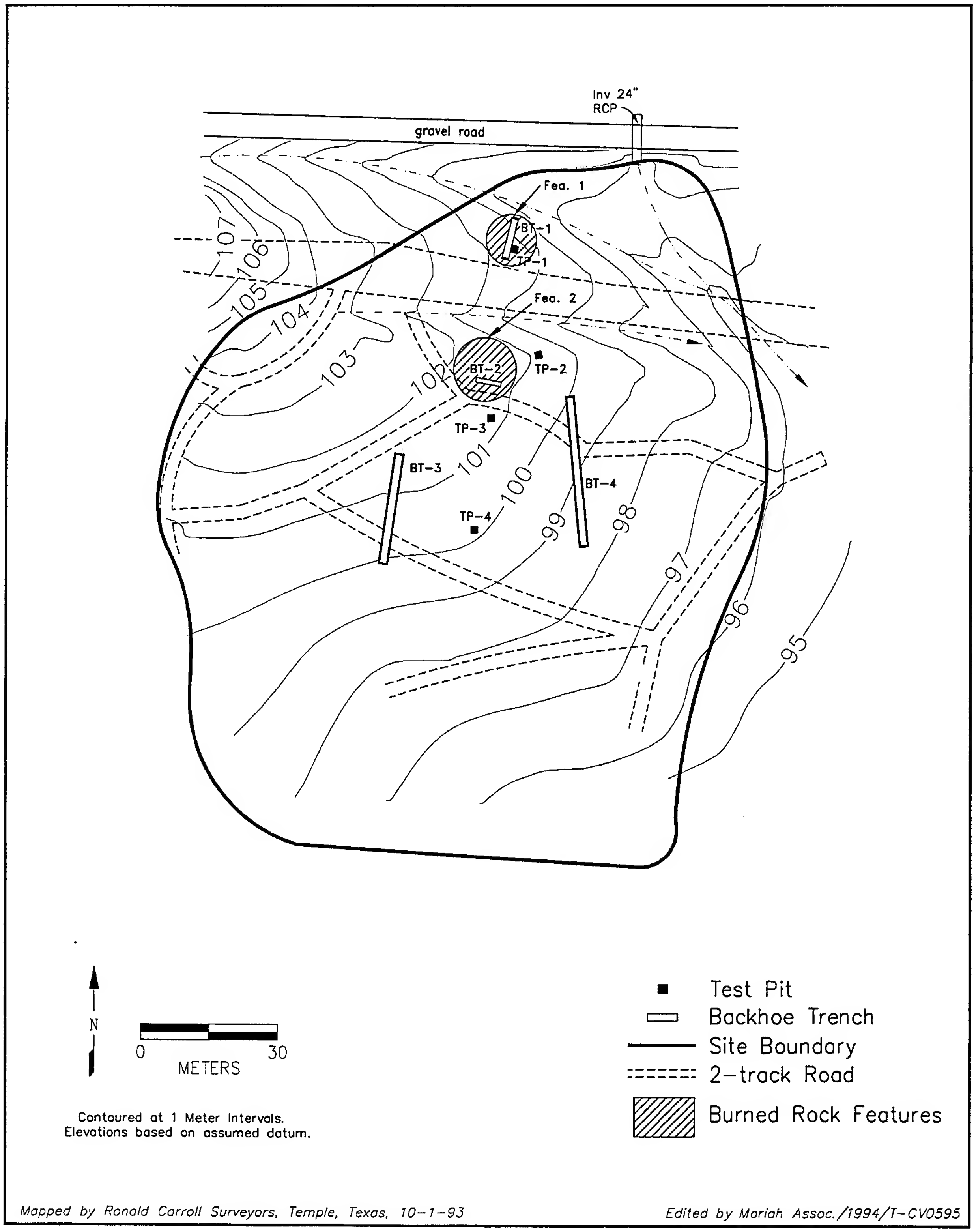

Figure 6.55 Site Map of 41CV595.

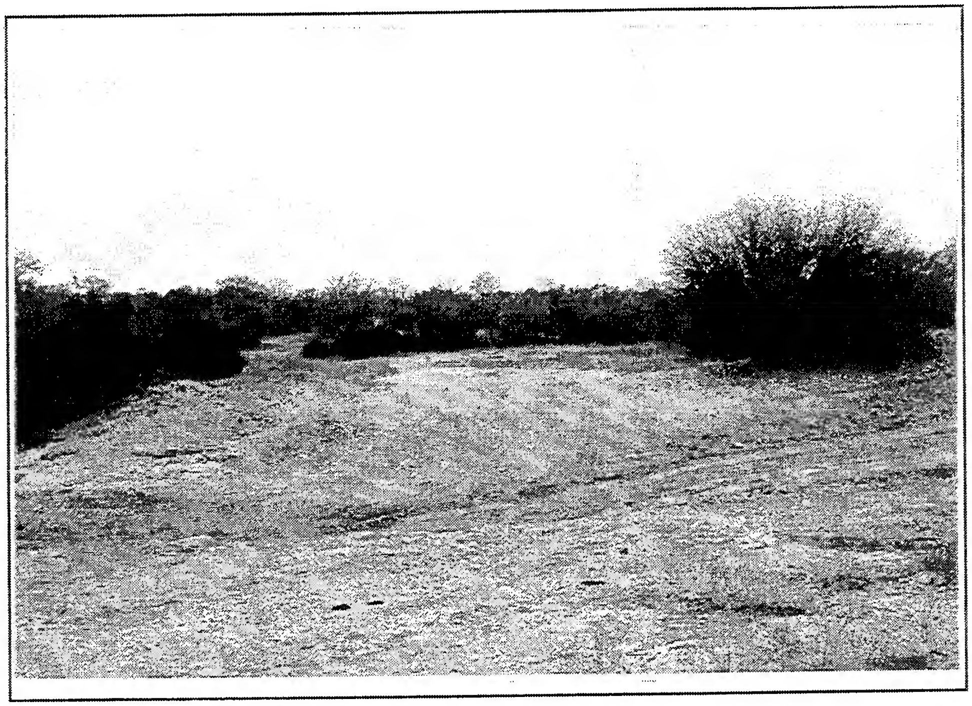

Figure 6.56 Overview of Site 41CV595, Looking South.

60% disturbed by vehicular traffic and military maneuvers. Mesrobian concluded that the site was in fairly good condition and that the presence of alluvial deposits could justify excavation.

Pry and Callum monitored the site on 2 February 1988. A "chopper" was collected during the visit. More burned rock concentrations were located as a result of greater than 85% of the site being disturbed by vehicular traffic, road construction, erosion, vegetation clearing, and scraping. The burned rock mound located on the initial survey was noted as being destroyed by scraping. Immediate mitigation of the site was recommended.

Mires and Frederick revisited the site on 28 April 1992, and reevaluated it on archeological and geomorphic observations. Cultural material and burned rock concentrations appeared to be shallowly buried within an A and E horizon of the soil present at the site. Because the site had the potential for intact cultural deposits, a crew returned in March 1992 and excavated 13 shovel tests. Cultural materials were recovered to a depth of 80 cmbs and included burned rock, debitage, bone, charcoal, and mussel shell. The results of shovel testing suggested that in situ cultural deposits appeared to be shallowly buried within at least two buried archeological components. Six to eight 1 x 1 m manually excavated test pits and three to five backhoe trenches were recommended to definitively assess NRHP eligibility (Trierweiler 1994:A965-A968).

6.8.1.3 New Work

Four 1 x 1 m test pits (TPs 1 through 4) and four backhoe trenches (BTs 1 through 4) were excavated (Table 6.68). Trenches 1 and 2 were excavated adjacent to eroding burned rock middens (designated Fs 1 and 2) to help provide cultural exposures. Trenches 3 and 4 were excavated near the upslope edge and downslope edge (respectively) of the Paluxy sand deposit in order to provide geoarcheological exposures. Test pit 1

was offset from BT 1, whereas the other test pits were placed as isolated units near features. Recovered cultural material is summarized in Table 6.9.

6.8.2 Results

Four trenches were excavated to evaluate the stratigraphy and context of cultural remains. The stratigraphic sequence in each trench is different, and in general, there appears to be three distinct periods of gully formation-erosion followed by colluvial deposition and pedogenesis. One of these cycles of erosion appears to have occurred during the Holocene concomitant with prehistoric occupation of the site. The other events are presumed, on the basis of pedogenic criteria, to be of early Holocene to late Pleistocene age. Figure 6.57 illustrates the profiles exposed in BT 1 and BT 4, which are representative of the range of variation on the site.

The youngest deposit (Unit 3) comprises the A horizon of the modern soil and is generally less than 20 cm thick, except where paleo-gullies are present (e.g. BT 1), in which case up to 180 cm of Holocene sediment may be present. Unit 3 consists of loose to friable, very dark grayish brown (10YR 3/2) loamy sand to sandy loam. Where paleo-gullies are present, a very weak Bk horizon was observed in similarly colored sediment at depths in excess of 60 cmbs. In areas lacking paleo-gullies, this deposit is thin and exhibits an A-E profile or A profile, with the E horizon only occurring on top of Unit 2 where Unit 3 was more than 20 cm thick. In some places (e.g. BT 4), Unit 3 rests on top of a prominent argillic horizon formed in Unit 2.

The Unit 2 deposit is 80 to 160 cm thick, and terminates upon a prominent, abrupt, wavy boundary that separates Unit 2 from either Unit 1 or pedogenically unmodified Paluxy sand. The soil formed in Unit 2 consists of a yellowish red (5YR 4/6 to 5YR 5/8) sandy clay Bt horizon that grades with depth to a BC horizon consisting of reddish yellow to yellow (7.5YR 7/8 to 10YR 7/6)

Table 6.68 List of Treatment Units, 41CV595.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	10	0.8	200
1	BT 2	5	0.8	170
1	BT 3	25	0.8	220
1	BT 4	32	0.8	200
1	TP 1	1.0	1.0	160
1	TP 2	1.0	1.0	80
1	TP 3	1.0	1.0	80
1	TP 4	1.0	1.0	30

sand and loamy sand. Distinct, rounded, and apparently pedogenically unmodified fragments of bedrock (Paluxy sand) were observed near the base of Unit 2, suggesting that bedrock erosion occurred during the initial phases of the unit's deposition. Cultural materials were observed in the top 20 cm of the Bt horizon of Unit 2 and throughout Unit 1, indicating that sedimentation of these units may be Holocene in age, although it is also possible that the material was worked into the upper Bt by turbation processes. Undulations in the lower boundary of Unit 2 suggest that gullies may have been associated with the erosion event between deposition of Units 1 and 2.

Unit 1 is strikingly different from Unit 2 in that a Bk-BC soil profile has formed in these sediments. The Bk horizon is generally reddish yellow (7.5YR 6/8) to yellowish red (5YR 4/6) loamy sand and sand, and exhibits primarily filamentous carbonates, although nodular forms appear to be present in a few places. The top of this soil is clearly truncated by erosion. In BT 4, Unit 1 seems to be gradational with the bedrock. However, in BT 3, Unit 1 is clearly deposited in prominent gullies cut into the unweathered Paluxy sand, with a thickness ranging between 30 to 170 cm. The unweathered parent material beneath all of the Quaternary colluvial units is the Paluxy Sand, which ranges in color from white to brownish yellow (10YR 8/1 to 10YR 6/8) and is often thinly bedded or laminated.

Table 6.69 Artifact Recovery by Test Pit, 41CV595.

	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	0	0	0(0)	0	0	5	0	5(0.5)	0	0	5	0	23(3.3)	0	0	14	1	0(0)
2	0	0	3	0	150(14)	0	6	12	0	8(0.5)	0	0	6	0	8(1.7)	0	0	30	1	0(0)
3	0	0	5	0	70(10)	0	0	16	0	8(1.5)	0	0	95	6	53(5.3)	0	0	13	0	1(0.3)
4	0	1	1	1	80(11.5)	0	0	8	0	11(1.5)	0	0	69	2	67(12.5)					
5	0	0	0	0	40(8.5)	0	0	17	0	15(2.5)	0	3	29	2	28(3.5)					
6	0	0	1	0	30(17)	0	0	8	1	40(37.5)	0	0	25	0	10(1.2)					
7	0	0	1	0	25(10)	0	0	2	1	10(2)	0	0	3	0	3(0.3)					
8	0	0	1	1	15(7.5)	0	0	6	0	0(0)	0	0	0	0	0(0)					
9	0	0	1	0	15(5.8)															
10	0	4	0	0	8(3)															
11	0	1	94	2	20(17)															
12	0	0	0	0	3(0.3)															
13	0	0	1	0	7(5)															
14	0	14	1	0	6(3.5)															
15	0	0	0	0	4(0.8)															
16	0	0	0	0	0(0)															
TOTAL	0	20	109	4	473(113.9)	0	6	74	2	97(46)	0	3	232	10	192(27.8)	0	0	57	2	1(0.3)

Trench 1 was excavated through F 1 (a burned rock midden) (see Figure 6.57). Judging from material observed in BT 1 and on the surface, F 1 is a 20 m long x 10 m wide x 1 m thick burned rock midden located at the northern portion of the site. TP 1 (Figure 6.58) was offset from the east wall of the trench and excavated to bedrock (157 cmbs). Although easily visible in profile, the thickness of F 1 (10 to 110 cmbs) was judged from the frequency of cultural materials recovered. A few cultural items (flakes and/or bone), along with varying amounts of burned rock and charcoal flecks, were recovered from each 10 cm level excavated through the feature. A few burned rocks, rodent bone fragments, and flakes were found beneath the feature from 110 to 157 cmbs.

Within TP 1, the frequency of burned rock diminished with depth while the size of individual rocks increased. The size of the burned rock ranged from small gravels up to pieces 15 cm long x 15 cm wide x 10 cm thick. Frequencies ranged from more than 150 pieces (14 kg) at 10 to 20 cmbs, to 30 pieces (17 kg) at 50 to 60 cmbs, to 8 pieces (3 kg) at 90 to 100 cmbs. Gravels have been mixed into the upper 30 to 35 cm, apparently by mechanical turbation associated with road construction and subsequent tank traffic, and large pieces of unburned, presumably colluvial limestone were present in the lower 40 cm. Two stratigraphically reversed radiocarbon dates were obtained from charcoal recovered from F 1. An age of 1240 ± 70 BP (Beta b-70034) was obtained from Level 3, while Level 6 yielded an age of 920 ± 80 BP (Beta b-70035). This suggests that the feature accreted over a minimum of several hundred years during the earlier phases of the Late Prehistoric, and has experienced some level of subsequent turbation, resulting in reversal of the ages.

This information is bolstered by two suites of A/I assays on Rabdotus from the same two levels in TP 1. Six snails from Level 3 yielded A/I values ranging from 0.039 to 0.103, which equate to

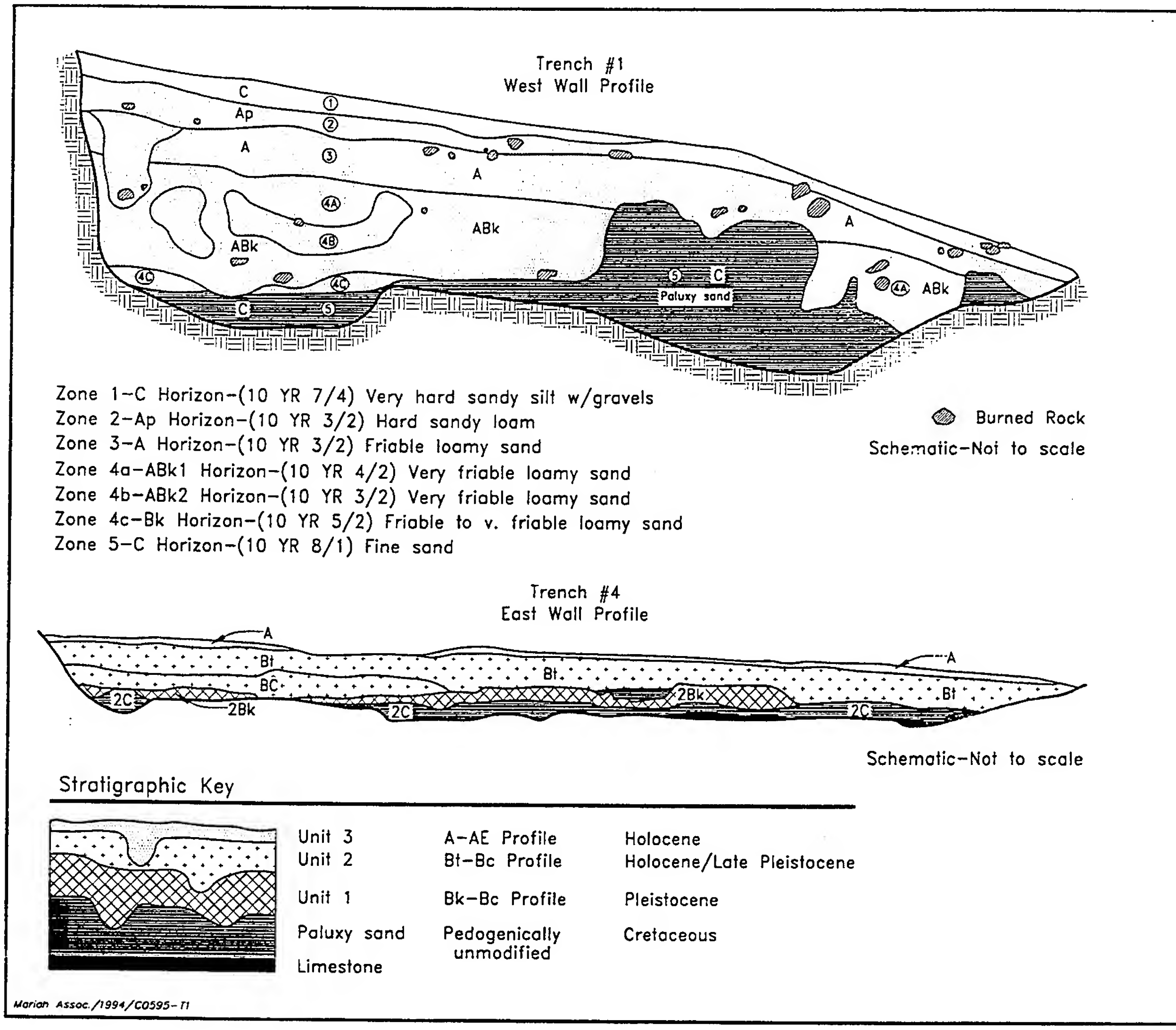

Figure 6.57 Generalized Stratigraphy and Schematic Profiles of BTs 1 and 4, 41CV595.

radiocarbon-equivalent "ages" between approximately 1350 BP and 4350 BP. Two two-shell clusters, equivalent to approximate radiocarbon ages of 1400 and 2150 BP, respectively, were apparent in the suite. The "younger" cluster is accepted as the best indicator of the age of the level. An additional five snails were assayed from Level 6, and yielded equivalent "ages" ranging between approximately 1150 and 2900 BP. None of these specimens clustered at ±5%, and the youngest snail was accepted as the best indicator of age. Note that while the A/I estimates are both slightly older than the corresponding radiocarbon ages from the same context (by approximately 150 years in Level 3 and 250 years in Level 6), they also show the same stratigraphic reversal. Moreover, when the 85-year age anomaly suggested by 1-sigma spread of the radiocarbon ages and the 5% spread of the interpreted A/I ages overlap, suggesting that they are statistically identical.

Test pits 2 and 3 were excavated to explore F 2 (a burned rock midden). Judging from cultural material observed on the surface and in the profile

of BT 2, F 2 is a 22 m long x 15 m wide x 0.7 m thick burned rock midden located approximately 15 m south of F 1. Test pit 2 (Figure 6.59) was placed near the eastern edge of F 2 and excavated to an argillic horizon at 80 cmbs. Within the test pit, several flakes and burned rocks were recovered from each level excavated through F 2 from 0 to 70 cmbs, with a dart point found in Level 7. The frequency of burned rock increased with depth and ranged from five small pieces (0.5 kg) from the upper 10 cm, to about 55 to 65 pieces (37.5 kg), reaching 20 x 10 x 10 cm in size, from 50 to 60 cmbs. In addition to these artifacts, a few gravels and unburned pieces of limestone were present in the upper 20 cm, several bone fragments were recovered from the upper 10 cm, and a few flakes were found below the feature at the top of the argillic horizon from 70 to 80 cmbs.

Test pit 3 was placed near the southern edge of F 2 and excavated to the argillic horizon at 80 cmbs. Within TP 3, numerous flakes and burned rocks were also recovered from each level excavated through F 2 from 0 to 70 cmbs. Burned rock frequencies were moderate to low in the upper two levels, peaked within the central levels, then decreased to the base of the feature. Frequencies ranged from eight pieces (1.7 kg) from 10 to 20 cmbs, to 67 pieces (12.5 kg) from 30 to 40 cmbs, to three pieces (0.25 kg) from 60 to 70 cmbs. Rock size ranged from small gravels up to pieces 15 cm long x 10 cm wide x 10 cm thick, and increased noticeably from 30 to 40 cmbs. In addition to these artifacts, a Scallorn arrow point and a Castroville point base were recovered from 20 to 30 cmbs, a Montell point base was recovered from 40 to 50 cmbs, and a few bone fragments were found from 40 to 50 cmbs. A radiocarbon age of 1860 ± 80 BP (Beta b-70033) was obtained on charcoal from Level 5, supporting the implication that the feature began to accrete during the Late/Transitional Archaic provided by the projectile points. No cultural material was found between the base of the feature and the top of the argillic horizon at 70 to 80 cmbs.

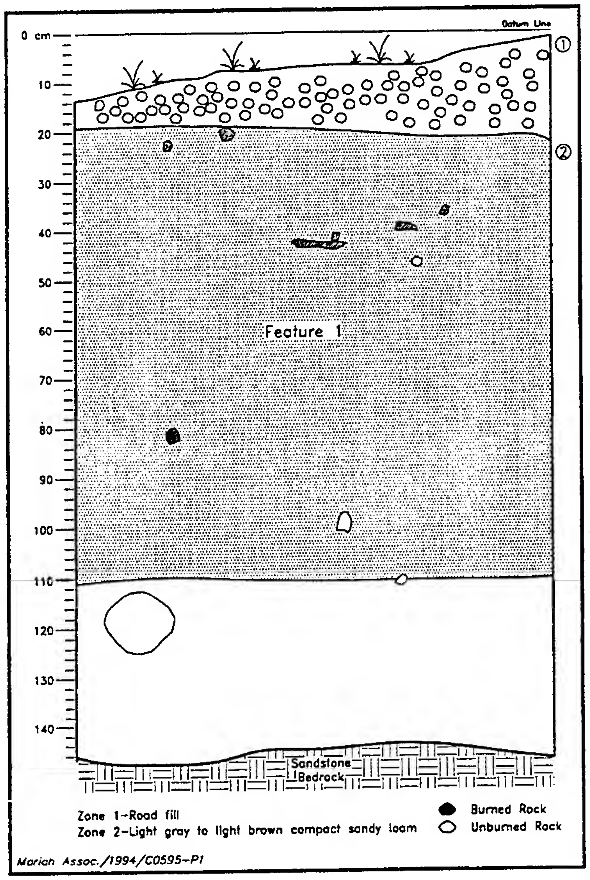

Figure 6.58 Profile of East Wall, TP 1, 41CV595.

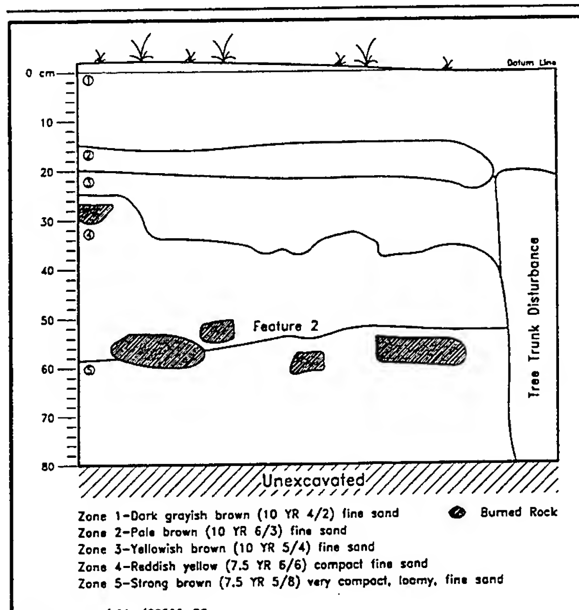

Figure 6.59 Profile of North Wall, TP 2, 41CV595.

Test pit 4 was placed approximately 25 m south of TP 3 and excavated to the argillic horizon at 30 cmbs. Within TP 4, numerous flakes were recovered from each level excavated. In addition to the flakes, an untyped dart point base was found at 8 cmbs and a burned rock was found from 20 to 27 cmbs. No cultural material was found within the few centimeters excavated into the argillic horizon from 27 to 30 cmbs.

The chipped stone tool assemblage from this site is rather small. Seven projectile points, including two from the surface, were recovered from this site during formal testing (Table 6.70). These diagnostics indicate occupations ranging in time from Middle Archaic to Late Prehistoric (Turner and Hester 1993). Interestingly, given the considerable distance to the Southeast Range province, Heiner Lake chert varieties account for more than 50% of the projectile points. The tools consist of 13 specimens ranging from early to late biface reduction and several unifacially modified tools (Table 6.71). Eleven chert varieties are present representing mostly indeterminate types (54%). Unlike the point assemblage, Southeast Range materials are not present, except for two specimens of Cowhouse White. The total identified cherts are Cowhouse (33%), North Fort (33%), and West Fort cherts (16.6%).

Fifteen identified chert types and nine indeterminate chert categories were recovered in the debitage from 41CV595 (Table 6.72). Roughly 23% of the assemblage was identified. When the entire debitage assemblage was considered, the aggregate indeterminates and Fort Hood Yellow occurred in greater than expected frequencies, while the remainder of identified types occurred in less than expected frequencies. Exclusion of the indeterminates resulted in Heiner Lake Tan and Fort Hood Yellow occurring in greater than expected frequencies; Cowhouse White, Heiner Lake Translucent Brown, Fort Hood Gray, Owl Creek Black, Cowhouse Mottled, Cowhouse Mottled/Flecked, Cowhouse Mottled/Banded, and Cowhouse Novaculite occurring in expected frequencies; and Anderson Mountain Gray, Seven

Table 6.70 Projectile Points, AU 1, 41CV595.

	Lithic Material					
Point Type	06-HL Tan	09-HL Tr Brown	15-Gry/Brn/Grn	Indet Lt Brown	Indet Lt Gray	Total
Castroville	0	1	0	0	0	1
Marshall	0	0	1	0	0	1
Montell	1	0	0	0	0	1
Other Dart	2	0	0	1	0	3
Scallorn	0	0	0	0	1	1
Total	**3**	**1**	**1**	**1**	**1**	**7**

Table 6.71 Lithic Tools, AU 1, 41CV595.

	Tool Type							
Lithic Material	early stage biface	late stage biface	middle stage biface	preform	side scraper	spokeshave	uniface	Total
02-C White	0	0	0	0	0	0	2	2
03-AM Gray	0	1	0	0	0	0	0	1
14-FH Gray	0	0	1	0	0	0	0	1
15-Gry/Brn/Grn	0	0	0	0	1	0	0	1
18-C Mottled	0	0	0	0	0	1	0	1
Indet Black	0	0	0	0	0	0	1	1
Indet Lt Brown	0	0	0	0	1	1	0	2
Indet Lt Gray	1	0	0	0	0	0	0	1
Indet Misc.	0	0	0	1	0	0	0	1
Indet Mottled	0	0	0	0	1	0	0	1
Indet White	1	0	0	0	0	0	0	1
Total	**2**	**1**	**1**	**1**	**3**	**2**	**3**	**13**

Mile Mountain Novaculite, Fossiliferous Pale Brown, Heiner Lake Blue, and Gray/Brown/Green occurring in less than expected frequencies (Table 6.73). Indeterminates are dominated by light brown flakes (31% of the total assemblage) with dark gray, light gray, dark brown, and white specimens important secondary components.

All four chert provinces are represented in the assemblage. The North Fort province is the most strongly represented, with four types comprising 54% of the identified total. Interestingly, the very strong representation of Fort Hood Yellow is not mirrored in the projectile point/tool assemblage, which is dominated by Southeast Range and other North Fort varieties. The Cowhouse and Southeast Range provinces are also a significant presence in the debitage assemblage, with five types comprising 21% of the identified total and three types representing 17% of the identified total, respectively (note that while it also occurs in the Southeast Range, Heiner Lake Translucent Brown is considered a component of the Cowhouse province at this site due to the latter's proximity). Although the site occurs within the boundary of the West Fort province, the generally poor-quality chert typical of the area makes up less than 2% of the identified assemblage.

Approximately 82% of the flakes are smaller than 1.8 cm, and only 11% retain vestiges of cortex, suggesting that latter-stage reduction or resharpening were the dominant lithic activities at the site. However, the presence of cortical flakes up to 5.2 cm in size indicates that activity was not totally restricted to final production and rejuvenation (Table 6.74).

Faunal material recovered from 41CV595 was relatively limited (Table 6.75). Recovered taxa include cottontail rabbit, unidentified artiodactyl, and unidentified deer-sized mammal. No shellfish remains were recovered from the site.

Table 6.72 Debitage Recovery by Size and Material Type, AU 1, 41CV595.

	Size (cm)					
Lithic Material	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types						
02-C White	0	0	3	3	0	6
03-AM Gray	0	0	1	0	0	1
04-7 Mile Novac	0	0	1	0	0	1
06-HL Tan	0	7	4	4	1	16
07-Foss Pale Brown	0	0	2	0	0	2
08-FH Yellow	5	19	16	4	1	45
09-HL Tr Brown	0	1	6	0	0	7
10-HL Blue	0	0	1	0	0	1
14-FH Gray	0	0	3	3	1	7
15-Gry/Brn/Grn	0	0	0	1	0	1
17-Owl Crk Black	0	1	0	4	0	5
18-C Mottled	0	0	0	3	0	3
22-C Mott/Flecks	0	0	5	0	1	6
23-C Mott/Banded	0	0	0	1	2	3
27-C Novaculite	0	0	3	0	0	3
Subtotal	*5*	*28*	*45*	*23*	*6*	*107*
Unidentified Types						
Indet Black	0	1	0	2	0	3
Indet Dk Brown	23	5	7	0	0	35
Indet Dk Gray	29	15	12	7	1	64
Indet Lt Brown	32	76	20	14	6	148
Indet Lt Gray	1	12	9	2	0	24
Indet Misc.	4	16	12	6	2	40
Indet Mottled	0	0	0	0	5	5
Indet Trans	0	5	1	0	0	6
Indet White	11	2	17	4	8	42
Subtotal	*100*	*132*	*78*	*35*	*22*	*367*
Total	**105**	**160**	**123**	**58**	**28**	**474**

6.8.3 Conclusions and Recommendations

Geoarcheological results clearly demonstrate that the weathering mantle formed above the Paluxy sand has been dynamic during the Holocene and late Pleistocene, and colluvial sedimentation appears to be a strong possible means of site burial. However, faunal turbation (e.g., by ants)

Table 6.73 Binomial Statistic Results, AU 1, 41CV595.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	6	19	40	less	3	13	expected
03-AM Gray	1	19	40	less	3	13	less
04-7 Mile Novac	1	19	40	less	3	13	less
06-HL Tan	16	19	40	less	3	13	more
07-Foss Pale Brown	2	19	40	less	3	13	less
08-FH Yellow	45	19	40	more	3	13	more
09-HL Tr Brown	7	19	40	less	3	13	expected
10-HL Blue	1	19	40	less	3	13	less
14-FH Gray	7	19	40	less	3	13	expected
15-Gry/Brn/Grn	1	19	40	less	3	13	less
17-Owl Crk Black	5	19	40	less	3	13	expected
18-C Mottled	3	19	40	less	3	13	expected
22-C Mott/Flecks	6	19	40	less	3	13	expected
23-C Mott/Banded	3	19	40	less	3	13	expected
27-C Novaculite	3	19	40	less	3	13	expected
Total Indet	367	19	40	more	na	na	na

cannot be excluded as a formative agent of burial, and is a possible explanation for the stratigraphic reversal of radiocarbon ages apparent in TP 1. The role of ants as geomorphic agents can be tested by comparing the frequency of macro- and microdebitage as a function of depth. Significant departures between the two groups, specifically when microdebitage is distributed throughout the profile, and macrodebitage is concentrated at depth, would support bioturbation as the major depositional agent. A similar analysis should be considered for all sites in this category (Paluxy sites). Unlike other sites elsewhere in Texas (e.g. East Texas), very few large burrows were observed, suggesting that rodent bioturbation may be minimal. Further work directed at dating the colluvial units may provide a data set complimentary to existing and ongoing paleoenvironmental studies of fluvial deposits on the base (Nordt 1992).

Feature 1, a burned rock midden, apparently contains low amounts of artifacts other than burned rock. Feature 2 apparently has larger amounts of artifacts, although the amounts are still modest, particularly in comparison with middens in other landscape contexts on Fort Hood. Given that middens generally are rich in artifactual materials and have been sought as sources of abundant chronology-building data (cf. Black et al. 1992), these features apparently represent a relatively narrow range of the behavioral variability associated with the burned rock midden phenomenon (Hester 1991). Because charcoal and bone are present, the middens have high potential to contain data that can contribute to an understanding of the technological systems associated with the formation of middens (Ellis et al. 1994). Furthermore, there are increasing hints that human activities and land use in the Paluxy context are behaviorally distinct from activities in other contexts, especially with respect to patterns of burned rock utilization, atypically low frequencies of lithics associated with burned rock in Paluxy sites, and an apparently high occurrence of features on Paluxy surfaces that contrasts with an apparently low occurrence of features on immediately adjacent surfaces (see Chapter 7.0).

The debitage assemblage represents a moderately sized but extremely diverse collection of raw material that primarily represents latter-stage tool production or rejuvenation which is supported by the tools. At the same time, the diversity of the assemblage suggests repeated use of the site by a relatively mobile population.

Although there is a high level of damage to the surface of the site, impacts appear to be restricted to the upper 20 cm of deposits. Cultural deposits, including features, occur at greater depths and appear to be minimally disturbed by bioturbation. Temporally diagnostic projectile points collected during testing, including points from midden deposits, imply that the middens formed during or after the Late Archaic period. This contrasts markedly with the date of another midden in the Paluxy context (at 41CV1027) for which both radiocarbon dates and temporal diagnostics imply formation during the very early part of the Middle Archaic period. The Paluxy midden phenomenon, therefore, appears to have substantial temporal depth, which increases the value of Paluxy middens as a topic in the areas of midden research (Collins 1991) and technological research (Ellis 1994).

On the basis of the above, we judge 41CV595 to be significant and eligible for inclusion in the NRHP by virtue of containing cultural and environmental data that can contribute substantially to the current state of prehistory development for Central Texas in general, and the Fort Hood area in particular. We therefore recommend that the site be avoided and protected to prevent the loss of significant scientific information. Because significant deposits occur in shallowly buried contexts and on the surface immediately adjacent to trails, the site requires measures to protect it against: (1) traffic by tracked and wheeled vehicles, (2) subsurface disturbance by vandalism, and (3) subsurface disturbance, both mechanical and manual excavations, by military personnel.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should

Table 6.74 Debitage Cortex Characteristics by Material Type, AU 1, 41CV595.

	Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types						
02-C White	0	0	0	6	0	6
03-AM Gray	0	0	0	1	0	1
04-7 Mile Novac	0	0	0	1	0	1
06-HL Tan	0	0	0	16	0	16
07-Foss Pale Brown	0	1	0	1	0	2
08-FH Yellow	0	1	0	44	0	45
09-HL Tr Brown	0	0	1	6	0	7
10-HL Blue	0	0	0	1	0	1
14-FH Gray	4	0	1	2	0	7
15-Gry/Brn/Grn	0	0	1	0	0	1
17-Owl Crk Black	0	0	0	5	0	5
18-C Mottled	1	1	0	1	0	3
22-C Mott/Flecks	0	0	0	6	0	6
23-C Mott/Banded	1	1	0	1	0	3
27-C Novaculite	0	0	0	3	0	3
Subtotal	*6*	*4*	*3*	*94*	*0*	*107*
Unidentified Types						
Indet Black	0	1	0	2	0	3
Indet Dk Brown	0	1	1	33	0	35
Indet Dk Gray	1	0	4	59	0	64
Indet Lt Brown	3	10	3	127	5	148
Indet Lt Gray	0	4	0	18	2	24
Indet Misc.	1	1	7	30	1	40
Indet Mottled	2	2	0	0	1	5
Indet Trans	0	0	0	6	0	6
Indet White	0	0	0	40	2	42
Subtotal	*7*	*19*	*15*	*315*	*11*	*367*
Total	**13**	**23**	**18**	**409**	**11**	**474**

reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include backhoe trenches and manual excavation of a block or blocks, exposing buried features and living surfaces, up to 125 m^2 in area. Block excavations should be focused largely on the areas near Fs 1 and 2, and should be placed to obtain data from surfaces adjacent to the middens in addition to obtaining data from the middens themselves. Given an average depth of 80 cm, block excavations could reach a total volume of approximately 100 m^2 of manual excavation. Backhoe trenches should be excavated to provide exposures for geoarcheological studies of landscape processes and to provide exposures for stratigraphic correlation of block excavations. Geoarcheological backhoe trenches should be carefully monitored because of the possibility that currently unidentified, intact features or occupations may be present at depth in subsurface gullies. Identification of such intact deposits could increase the volume estimate for manual excavations by an unknown amount.

Table 6.75 Faunal Recovery, AU 1, 41CV595.

	Element						
Vertebrates	Cranium	Fused 3&4th metata	Humerus	Indeterminate	Pelvis	Permanent tooth	Total
Artiodactyla	0	1	1	0	0	0	2
Mammalia	0	0	0	11	0	0	11
Mammalia (med/lg)	0	0	0	7	0	0	7
Sylvilagus sp.	1	0	0	0	1	4	6
Vertebrata	0	0	0	3	0	0	3
Total	**1**	**1**	**1**	**21**	**1**	**4**	**29**

6.9 SITE 41CV960

6.9.1 Introduction

In late July and August 1993, Mariah conducted test excavations at site 41CV960. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.9.1.1 Location and Description

Site 41CV960 straddles the confluence of Cowhouse Creek and an unnamed tributary, and includes portions of a Holocene terrace of Cowhouse Creek and the floodplain of the unnamed tributary (Figures 6.60 and 6.61). The Holocene terrace has been cleared of vegetation and a tank trail traverses the site. Two burned rock middens (Fs 3 and 4) are exposed on the surface of the site. Maximum site dimensions are 140 x 200 m (about 28,000 m^2, or 6.9 acres). For the purposes of this report, 41CV960 is located in the West Cowhouse area of the fort.

6.9.1.2 Previous Work

This site was first recorded by Thomas and Bradle on 16 July 1985 as a dense and vandalized deposit of thermally altered limestone, flakes, tools, and mussel shell. A few artifacts were noted as being confiscated from vandals who were confronted on this site on 20 June 1985. Thomas and Bradle collected a keeled end scraper and observed a high density of debitage, bifaces, scrapers, a burned rock concentration, and a hammerstone. Based on cutbank exposures, the site matrix was described as more than 4 m of alluvial clay loam. The site was estimated to be 50% disturbed by vehicular traffic, bulldozing, vandalism, and erosion.

Quigg and Frederick revisited the site on 23 January 1992 and reevaluated the site based on archeological and geomorphic observations. The site was divided into Subareas A (the Holocene

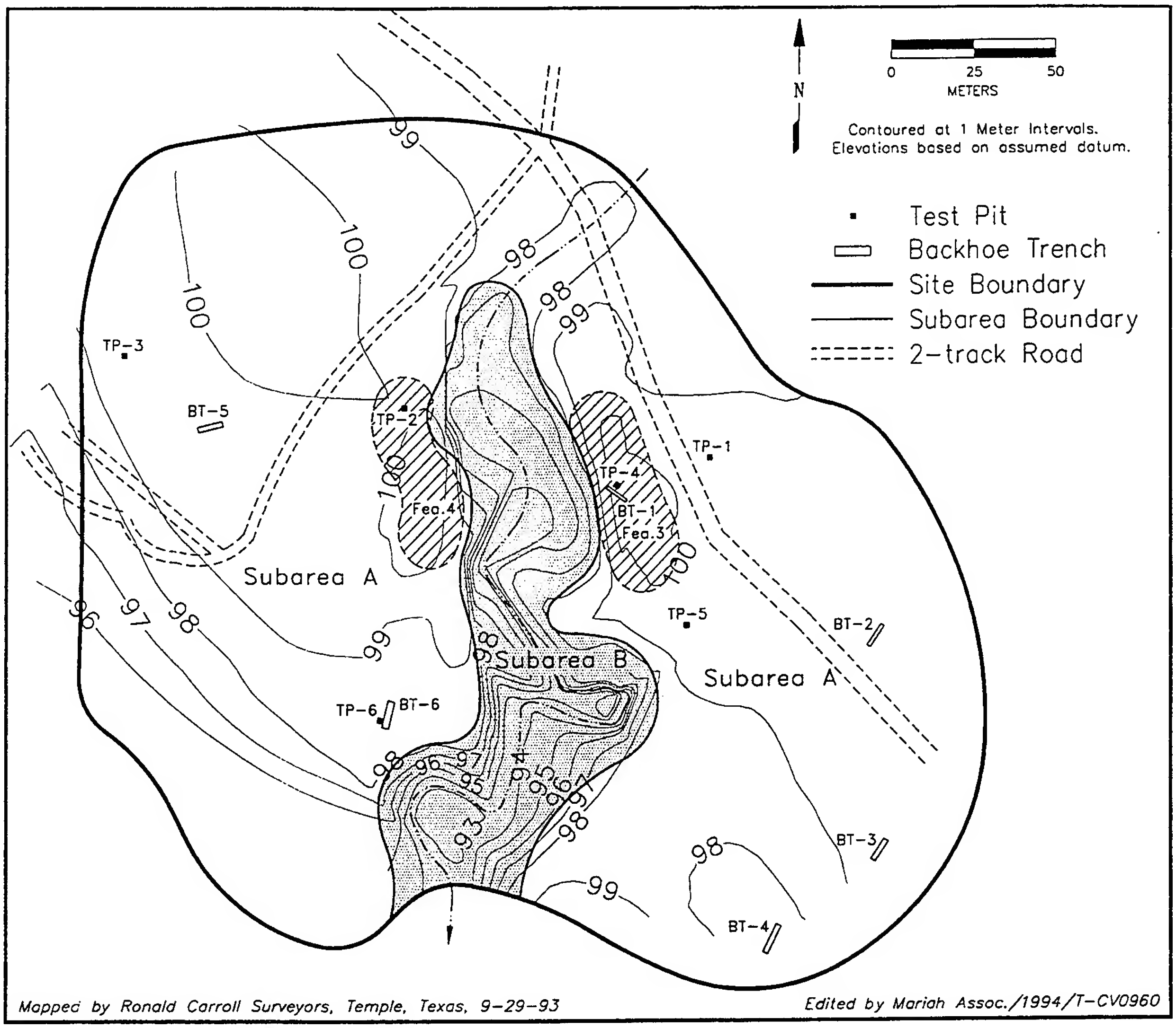

Figure 6.60 Site Map of 41CV960.

terrace) and Subarea B (the tributary floodplain) during reconnaissance. No further work was recommended for Subarea B. Because Subarea A had the potential for intact cultural deposits, a crew returned in February 1992 and excavated a total of 39 shovel tests. Cultural materials were recovered to a depth of 80 cmbs and included burned rock, debitage, bone and mussel shell fragments, and a piece of groundstone. On the basis of the shovel testing, the NRHP eligibility of Subarea A was uncertain, and further testing was recommended. Six to eight 1 x 1 m manually excavated test pits and six to seven backhoe trenches were recommended to determine eligibility (Trierweiler 1994:A1124-A1126).

6.9.1.3 New Work

Six 1 x 1 m test pits (TPs 1 through 6) and six backhoe trenches (BTs 1 through 6) were excavated at the site (Table 6.76). Trenches 2, 3, and 4 were placed east of the established site boundary. Trench 1 and TPs 1, 4, and 5 were excavated on the east side of the unnamed drainage, on or near F 3. Test pits 2, 3, and 6 and BTs 5 and 6 were excavated on the west side of

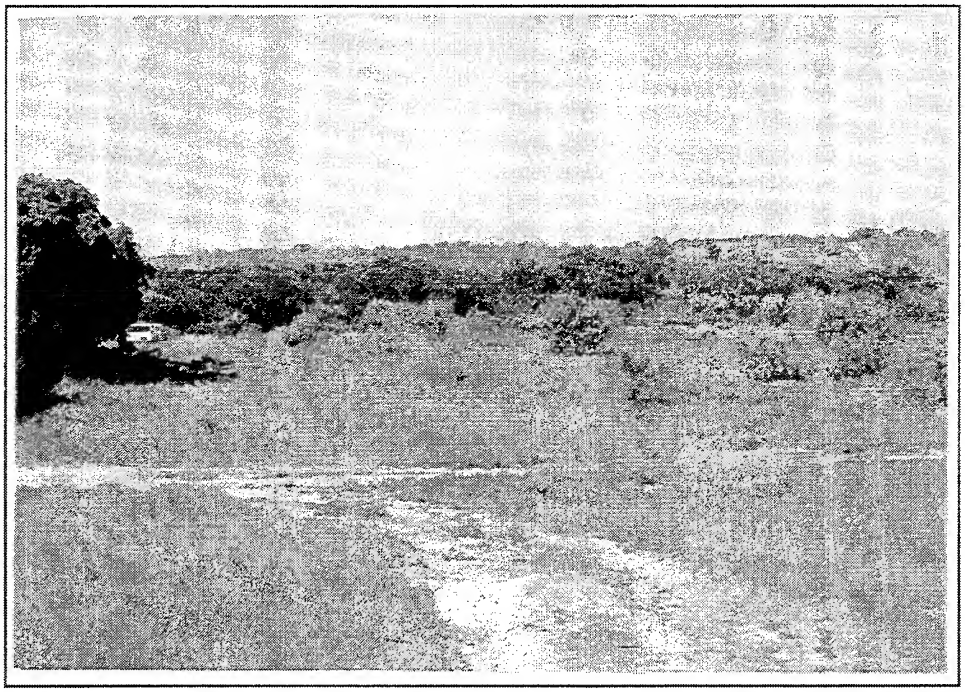

Figure 6.61 Overview of Site 41CV960, Looking Southwest.

the unnamed drainage, with TP 2 placed on F 4. A total of 13 m^2 was manually excavated. Recovered cultural material is summarized in Table 6.77.

6.9.2 Results

Six trenches were excavated at this site in order to prospect for buried cultural deposits and identify depositional units. One of these trenches (BT 4) was placed on the T_0 surface of Cowhouse Creek, and the other five were placed into the T_1 surface west and east of the unnamed drainage that traverses the site. The excavations on the east and west sides of the drainage are discussed separately below.

At least two fills appear to be present in Subarea A: a younger unit beneath the T_0 surface that is assumed to be the Ford alluvium, and an older deposit beneath the T_1 surface that may be the West Range alluvium, the Fort Hood alluvium, or both (cf. Nordt 1992).

Table 6.76 List of Treatment Units, 41CV960.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	5	0.8	220
1	BT 2	7	0.8	285
1	BT 3	7	0.8	310
1	BT 4	8	0.8	350
1	TP 1	1.0	1.0	150
1	TP 4	1.0	1.0	450
1	TP 5	1.0	1.0	210
2	BT 5	7	0.8	290
2	BT 6	6	0.8	310
2	TP 2	1.0	1.0	200
2	TP 3	1.0	1.0	140
2	TP 6	1.0	1.0	150

Table 6.77 Artifact Recovery by Test Pit, 41CV960.

	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4					TEST PIT 5					TEST PIT 6				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	5	0	0(0)	2	0	59	2	0(0)	0	0	0	0	0(0)	2	7	134	4	136(9.5)	1	1	3	0	7(0.3)	0	0	0	0	1(0.1)
2	1	0	8	0	7(1)	15	4	210	6	0(0)	0	0	0	0	0(0)	12	10	137	2	83(6)	0	0	0	0	2(0.3)	0	0	0	0	1(0.1)
3	0	0	22	1	10(1)	1	5	297	5	0(0)	0	0	0	0	0(0)	12	6	166	2	125(15.5)	0	1	1	0	12(1)	0	0	0	0	0(0)
4	2	0	25	0	25(1)	0	4	99	0	0(0)	0	0	0	0	1(0.1)	11	18	158	3	118(14)	0	0	0	0	1(0.3)	0	0	0	0	0(0)
5	0	0	23	0	27(1)	0	0	37	0	0(0)	0	0	0	0	1(0.1)	13	11	105	5	128(11.5)	0	0	0	0	0(0)	0	0	0	0	0(0)
6	0	0	4	0	12(1)	1	1	38	0	0(0)	0	0	1	0	0(0)	9	13	241	8	110(18)	0	0	0	0	1(0.3)	0	0	0	0	0(0)
7	3	0	7	1	31(7)	0	0	0	0	0(0)	0	0	0	0	0(0)	20	2	0	0	40(5)	0	0	0	0	0(0)	0	0	0	0	0(0)
8	0	0	5	0	1(0.3)	0	0	2	0	0(0)	0	0	0	0	0(0)	3	4	32	0	9(1)	0	0	0	0	0(0)	0	0	0	0	0(0)
9	0	0	0	0	1(0.3)	0	1	6	1	7(0.3)	0	0	0	0	0(0)	6	0	21	0	236(81)	0	0	0	0	0(0)	0	0	0	0	0(0)
10	11	0	1	0	22(1)	1	0	7	0	5(0.2)	0	0	0	0	1(0.1)	0	0	3	0	7(1)	0	0	0	0	1(0.3)	0	0	0	0	0(0)
11	1	0	1	0	10(0.5)	0	0	7	0	1(0.5)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	1(0.3)	0	0	0	0	0(0)
12	0	0	2	0	1(0.3)	0	0	2	0	12(1)	0	0	0	0	0(0)	0	0	1	0	2(1)	0	0	0	0	1(0.3)	0	0	0	0	0(0)
13	0	0	1	0	0(0)	0	3	2	0	6(1)	0	0	0	0	1(0.2)	0	0	0	0	3(1)	0	0	0	0	0(0)	0	0	0	0	0(0)
14	0	0	0	0	0(0)	0	0	0	0	1(0.1)	0	0	0	0	0(0)	1	0	2	0	0(0)	0	0	0	0	1(0.3)	0	0	0	0	0(0)
15	0	0	0	0	0(0)	1	3	0	0	0(0)						5	0	0	0	3(2)	0	0	1	0	2(1)	0	0	0	0	0(0)
16						0	0	0	0	0(0)						0	0	0	0	1(1)	0	0	0	0	1(0.3)					
17						0	0	2	0	1(0.1)						0	0	0	0	7(1)	0	0	0	0	1(0.3)					
18						0	0	0	0	0(0)						0	0	0	0	0(1)	0	0	2	0	2(0.3)					
19						0	0	0	0	0(0)						0	0	0	0	0(0)	0	0	0	0	0(0)					
20						1	0	0	0	0(0)						0	0	0	0	0(0)	0	0	0	0	2(0.3)					
21																0	0	0	0	0(0)	0	0	0	0	0(0)					
22																0	0	0	0	0(0)										
23																0	0	0	0	0(0)										
24																0	0	0	0	0(0)										
25																0	0	0	0	0(0)										
26																0	0	0	0	0(0)										
27																0	0	0	0	0(0)										
28																0	1	0	0	0(0)										
29																0	0	0	0	2(0.5)										
30																0	0	0	0	0(0)										
31																0	0	0	0	0(0)										
32																0	0	0	0	0(0)										
33																0	0	0	0	1(0.1)										
34																0	0	0	0	2(0)										
35																0	0	0	0	6(5)										
36																0	8	0	0	1(0.5)										
37																0	0	0	0	0(0)										
38																0	0	0	0	0(0)										
39																0	0	0	0	0(0)										
40																0	0	0	0	0(0)										
41																0	0	0	0	0(0)										
42																0	0	0	0	0(0)										
43																0	0	0	0	0(0)										
44																0	0	0	0	0(0)										
45																0	0	0	0	0(0)										
TOTAL	18	0	104	2	147(14.4)	22	21	768	14	32(3.1)	0	0	1	0	4(0.5)	94	80	1000	24	1023(176.1)	1	2	7	0	36(5.6)	0	0	0	0	2(0.2)

6.9.2.1 Excavations East of the Tributary

The deposits exposed by BT 4 beneath the T_0 surface are very sandy and exhibit an A-AB-Bk-C horizon (Figure 6.62). The A horizon is a very dark grayish brown, fine sandy loam with weak, coarse, subangular blocky structure, and is approximately 30 cm thick. It is separated from the Bk horizon by a 30 cm thick transitional horizon (ABk) that has very few calcium carbonate filaments. The Bk horizon has 1 to 5% filamentous carbonates on ped surfaces and

textures ranging between sandy loam and loamy sand. At least one normally graded bed set is contained within the Bk horizon, but the lithic boundaries between units have been blurred by pedogenesis. The C horizon is a brown sandy loam and lacks significant secondary carbonates. The general appearance and stratigraphic position of this deposit suggests that it is the Ford alluvium. No cultural material was observed in this deposit.

Feature 3 is located on the east side of the drainage. Based on observed cultural material along a tank trail and within TP 4, F 3 is a sheet-like, burned rock midden at least 35 m long x 20 m wide x 68 cm thick. Trench 1 (Figure 6.63) was excavated in F 3, and exhibited an A-ABk-Bk profile developed in alluvium tentatively interpreted to be equivalent to the West Range of Nordt (1992). Items collected from the backhoe backdirt pile included a Pedernales dart point base, a complete Castroville point, a bone awl, the basal section of a deer antler, and an unidentified bone. The southern edge of F 2, a large hearth, was observed in the northern trench profile below F 3.

Test pit 4 was offset from the north wall of BT 1 and excavated through F 3 and F 2 to 450 cmbs (Figure 6.64). Although the upper 20 cm of fill within TP 4 appeared to be disturbed by cultivation, a high density of artifacts (debitage and burned rock) and ecofacts (bone and mussel shell) was recovered from each level excavated through F 3 from 0 to 70 cmbs. Within TP 4, the feature was composed of a dark, charcoal-stained clay loam containing 740 angular burned rocks (79.5 kg), debitage, bone, and snail and mussel shell. The size of the burned rocks ranged from gravels to pieces up to 15 cm in diameter. Frequencies and size grades were distributed relatively uniformly from the top to the bottom of the feature. Two untyped dart points were recovered near the base of the feature. A radiocarbon age of 3200 ± 60 BP (Beta b-70038) was obtained on charcoal collected from Level 7, near the base of the feature, suggesting that the fill is equivalent to the West Range of Nordt, as predicted in the field, and that the feature is of late Middle Archaic age.

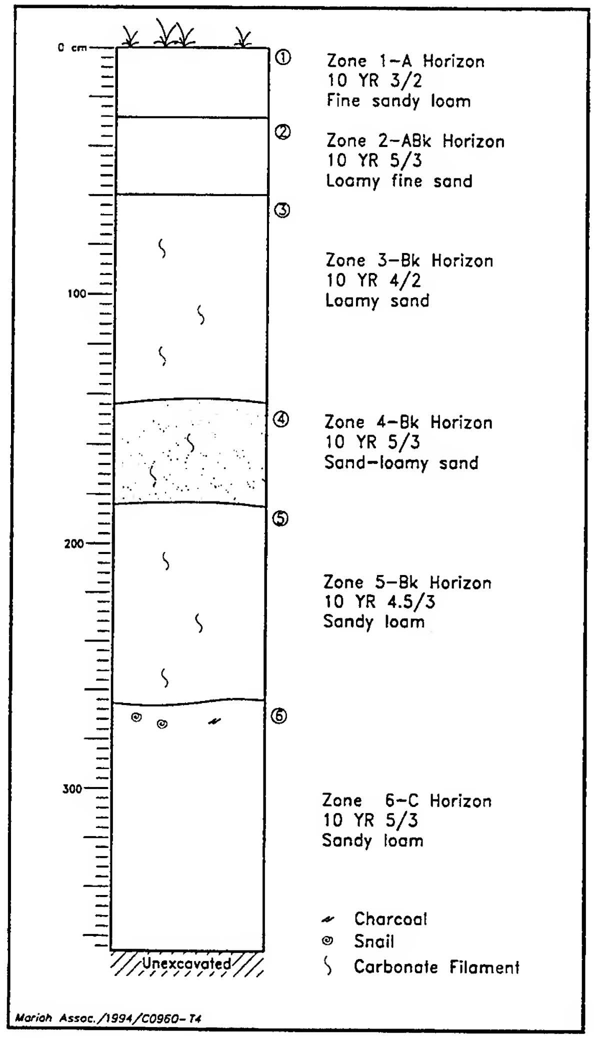

Figure 6.62 Measured Section, BT 4, 41CV960.

The numbers of artifacts and ecofacts began to decrease below F 3 from 70 to 78 cmbs. Feature 2 was encountered from 78 to 96 cmbs. It consisted of a large, slightly basin-shaped hearth (Figure 6.65). Although this feature was visible in the north wall of BT 1, it did not extend across the trench to the south wall, suggesting that the trench had only clipped the edge. After the feature was exposed, dense burned rock covered all but the southwest and northeast corners of TP 4. This suggests that the feature is circular in shape and that the majority of it was excavated. However, the feature extended into the west and north walls

of TP 4. The feature was composed of 236 burned rocks (81 kg total), within a lightly charcoal-stained gray clay loam. The size of the rock ranged from small angular gravels to large blocky pieces 15 to 18 cm in diameter. Several flakes and a mussel shell were recovered from the hearth. The feature appeared to be intact, with only a few small, intrusive, rodent burrows and insect casts being observed.

A few flakes and scattered burned rocks were found below F 2 from 96 to 100 cmbs. Cultural material recovered from 100 to 180 cmbs ranged from a few flakes, burned rocks, and mussel shells in a few levels, to a single burned rock in other levels. From 180 cmbs to the base of the test pit, several groups of contiguous sterile levels were interrupted by a few levels containing extremely low frequencies of burned rock with associated ecofacts, possibly indicative of a series of sparse, stratigraphically separated components.

Test pit 1 was placed approximately 5 m east of a tank trail containing eroded burned rock midden debris (presumably related to F 3) and excavated to 150 cmbs. The upper 20 cm of this test pit contained low densities of prehistoric cultural material and modern military debris, and may have also been disturbed by cultivation. The majority of lithic artifacts were recovered from 20 to 50 cmbs, with numerous flakes and burned rocks found in each level. The frequency of artifacts decreased abruptly from 50 to 60 cmbs. Feature 1 was exposed from 59 to 69 cmbs.

Feature 1 consisted of a small cluster of burned rock, probably representing a hearth, that was located at the southwest corner of TP 1 (Figure 6.66). Although no burned rock remained in the test pit walls after excavation, the feature may extend southwest beyond the test pit boundary. The feature consisted of a wedge of 31 clustered, angular and blocky burned rocks (7 kg total), contained within a brown silty clay loam. Charcoal staining was observed directly below the hearth. The only materials associated with the feature were the midsection of a bifacially worked

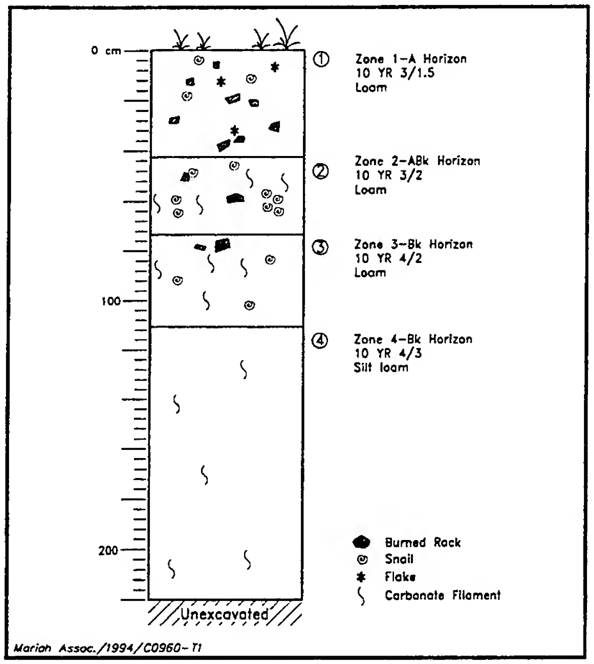

Figure 6.63 Measured Section, BT 1, 41CV960.

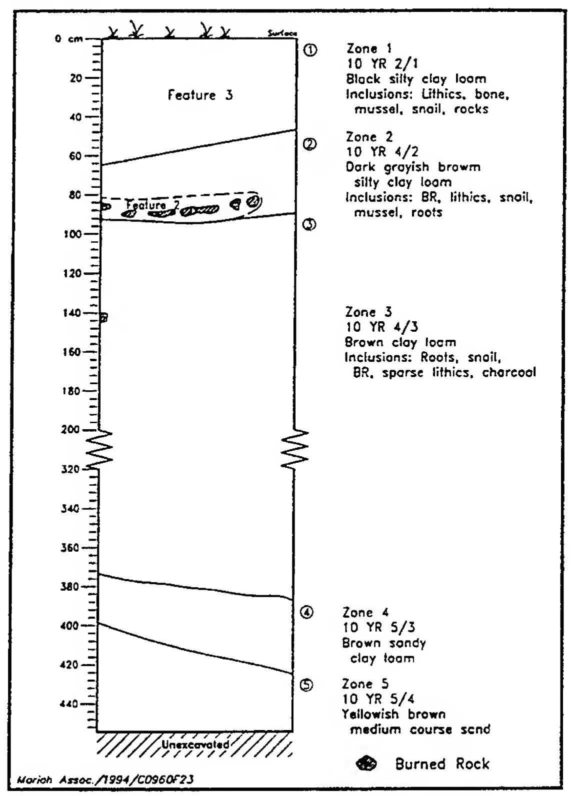

Figure 6.64 Profile of North Wall, TP 4, Illustrating Stratigraphic Position of Fs 2 and 3, 41CV960.

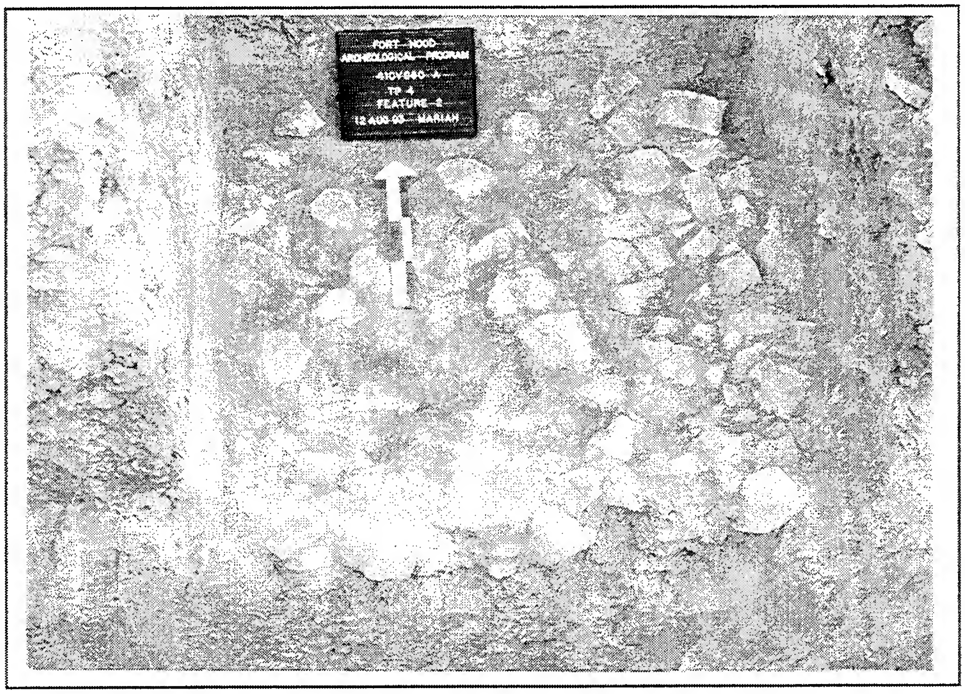

Figure 6.65 Feature 2, 41CV960, Looking North.

tool and a couple of mussel shells. Below F 1, with the exception of several burned rocks found from 90 to 110 cmbs, few artifacts were recovered from each level excavated from 70 to 130 cmbs. From 130 to 150 cmbs, no cultural material was found.

Test pit 5 was placed 30 to 35 m southeast of TP 4 and excavated to 210 cmbs. Cultivation had also impacted the upper 20 cm of this test pit. Modern military debris was recovered, along with a few prehistoric artifacts, from the upper 10 cm. A few burned rocks and a prehistoric ceramic sherd were recovered from 10 to 20 cmbs. Within the test pit, the highest frequency of burned rocks was found from 20 to 30 cmbs. A flake and bone fragment were also recovered from this level. The cultural material found from 0 to 30 cmbs may represent the eastern fringe of F 3, although the presence of ceramics probably implies a discrete occupation, now destroyed, on the terrace surface. From 30 cmbs to the base of the test pit, extremely low densities of artifacts were found.

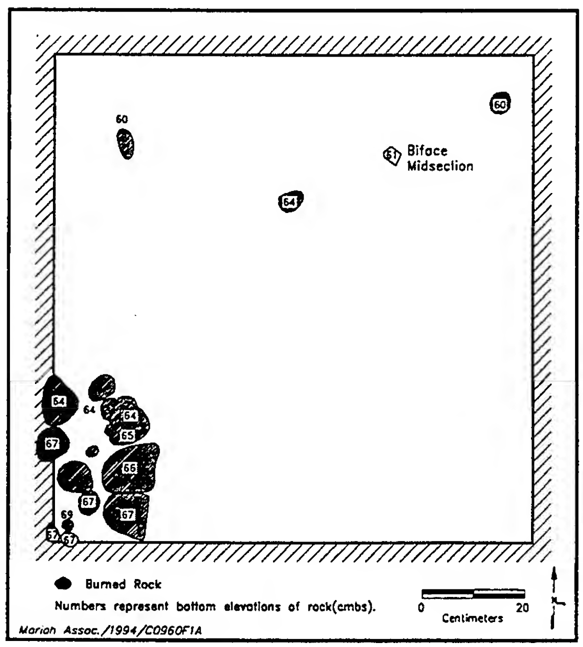

Figure 6.66 Plan View of TP 1, F 1, 41CV960.

Two untyped dart points were recovered from this AU (Table 6.78). The general chipped stone assemblage consists of 24 specimens including bifacial and unifacially modified tools (Table 6.79). The Southeast Range province is represented by three chert types (Heiner Lake Tan, Heiner Lake Translucent Brown, and East Range Flecked), North Fort by two types (Fort Hood Gray and Gray/Brown/Green), and the Cowhouse province by two types (Cowhouse Mottled and Cowhouse Dark Gray).

Sixteen identified chert types and nine indeterminate chert categories were included in the debitage assemblage recovered from AU 1 (Table 6.80). Approximately 17% of the assemblage was identified. When the entire assemblage was considered, the aggregate indeterminates occurred in greater than expected frequency, Fort Hood Yellow occurred in expected frequency, and the remainder of identified types occurred in less than expected frequency. When the indeterminates were excluded from consideration, Fort Hood Yellow and Heiner Lake Tan occurred in greater than expected frequency; Heiner Lake Translucent Brown, Fort Hood Gray, Owl Creek Black, and Cowhouse Dark Gray occurred in expected frequencies; and Cowhouse White, Anderson Mountain Gray, Texas Novaculite, Heiner Lake Blue, East Range Flat, East Range Flecked, Gray/Brown/Green, Cowhouse Mottled/Flecked, and Table Rock Flat occurred in less than expected frequencies (Table 6.81).

All four chert provinces are represented in the assemblage. The dominant province is North Fort, which is represented by five types that comprise 54% of the identified assemblage. The Southeast Range is also well represented, with three types that comprise 27% of the identified total. This percentage may actually be higher, because an additional type characteristic of both the Southeast Range and Cowhouse provinces (Heiner Lake Translucent Brown) was treated as a member of the latter province due to its proximity. Including Heiner Lake Translucent Brown, the Cowhouse province is represented by five types that comprise approximately 17% of the identified total. A distant fourth is occupied by the West Fort province, which is represented by a single type comprising only about 1% of the identified assemblage. Indeterminates are dominated by light brown flakes (31% of the total assemblage), suggesting that the frequency of Fort Hood Yellow

Table 6.78 Projectile Points, AU 1, 41CV960.

	Lithic Material		
Point Type	06-HL Tan	Indet White	Total
Other Dart	1	1	2
Total	**1**	**1**	**2**

Table 6.79 Lithic Tools, AU 1, 41CV960.

	Tool Type							
Lithic Material	end scraper	late stage biface	middle stage biface	preform	side scraper	uniface	utilized flake	Total
06-HL Tan	1	1	0	1	0	0	1	4
09-HL Tr Brown	0	0	1	0	0	0	0	1
10-HL Blue	0	0	0	0	0	0	1	1
13-ER Flecked	0	0	0	0	1	0	0	1
14-FH Gray	0	0	0	0	0	1	0	1
15-Gry/Brn/Grn	0	3	0	0	0	1	0	4
18-C Mottled	0	0	0	0	1	0	0	1
19-C Dr Gray	0	1	0	0	0	0	0	1
Indet Lt Brown	0	4	0	0	0	1	0	5
Indet Lt Gray	0	2	0	0	0	1	0	3
Indet Misc	0	1	0	0	0	0	1	2
Total	**1**	**12**	**1**	**1**	**2**	**4**	**3**	**24**

and Heiner Lake Tan may be greater than indicated. Other important indeterminates include dark brown flakes (15%), dark gray flakes (8%), and light gray flakes (7%).

The assemblage is dominated by relatively small flakes; 79% are smaller than 1.8 cm, and only 3% are larger than 2.6 cm (Table 6.80). Roughly 88% of the total assemblage is decortified, and no primary decortification flakes were recovered (Table 6.82). This suggests that intermediate and latter-stage lithic reduction was the most important stage of tool production practiced at the site. Only 18% of the recovered cortical flakes are clearly unabraded, suggesting that the majority of the relatively small assemblage of early-stage flakes were produced from raw material procured from the adjacent streambed.

A moderately-size faunal assemblage, including at least three vertebrate taxa (deer, turtle, and armadillo) and four mussel taxa (Amblema, Lampsilis, Toxolasia, and Tritigonia) was recovered from AU 1 (Table 6.83). Although the deer and possibly the turtle may represent economically exploited species, the armadillo is a historic-era immigrant and clearly represents an intrusive species. Although the mussel-shell assemblage indicates that some exploitation of aquatic resources in Cowhouse Creek was practiced, the relatively low species diversity in comparison to other Cowhouse Creek terrace sites (e.g., 41CV97) suggests that this resource was of secondary importance at best.

One prehistoric ceramic sherd was recovered from Test Pit 5 and was submitted for petrographic study. It has been completely fired and has a polished interior and exterior. Petrographic analysis suggests that it was a Caddoan-influenced or traded, Caddoan grog-tempered vessel (see Appendix E).

Table 6.80 Debitage Recovery by Size and Material Type, AU 1, 41CV960.

	Size (cm)							
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	Total
Identified Types								
02-C White	0	0	0	0	0	1	0	1
03-AM Gray	0	0	0	0	2	0	0	2
05-Texas Novac	0	0	0	0	0	1	0	1
06-HL Tan	0	0	9	17	17	2	0	45
08-FH Yellow	0	30	11	16	11	3	0	71
09-HL Tr Brown	0	0	5	0	6	3	0	14
10-HL Blue	0	0	1	0	0	0	0	1
11-ER Flat	0	0	0	0	0	1	0	1
13-ER Flecked	0	0	1	0	1	1	0	3
14-FH Gray	0	0	0	0	8	0	0	8
15-Gry/Brn/Grn	0	0	0	0	2	0	0	2
17-Owl Crk Black	0	8	3	1	3	2	0	17
18-C Mottled	0	0	0	1	0	1	0	2
19-C Dr Gray	0	0	0	5	2	3	0	10
22-C Mott/Flecks	0	0	0	0	3	0	1	4
28-Table Rock Flat	0	0	0	2	0	0	0	2
Subtotal	*0*	*38*	*30*	*42*	*55*	*18*	*1*	*184*
Unidentified Types								
Indet Black	0	0	25	5	0	0	0	30
Indet Dk Brown	0	97	31	14	18	1	0	161
Indet Dk Gray	4	17	20	33	16	2	0	92
Indet Lt Brown	14	94	144	42	48	2	1	345
Indet Lt Gray	1	42	12	16	7	3	0	81
Indet Misc.	3	27	27	55	40	0	0	152
Indet Mottled	0	0	0	4	7	1	0	12
Indet Trans	0	6	15	4	3	0	0	28
Indet White	0	5	5	9	7	0	0	26
Subtotal	*22*	*288*	*279*	*182*	*146*	*9*	*1*	*927*
Total	**22**	**326**	**309**	**224**	**201**	**27**	**2**	**1111**

6.9.2.2 Excavations West of the Tributary

Two backhoe trenches (BT 5 and BT 6) were excavated in AU 2. Each of these trenches exposed similar, thick, Ap-ABk-Bk soil profiles developed in silty loam to silty clay loam alluvium interpreted as the West Range of Nordt (1992). Figure 6.67 illustrates the profile revealed in BT 5, which is typical of the exposures in AU 2.

Table 6.81 Binomial Statistic Results, AU 1, 41CV960.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	1	50	81	less	5	18	less
03-AM Gray	2	50	81	less	5	18	less
05-Texas Novac	1	50	81	less	5	18	less
06-HL Tan	45	50	81	less	5	18	more
08-FH Yellow	71	50	81	expected	5	18	more
09-HL Tr Brown	14	50	81	less	5	18	expected
10-HL Blue	1	50	81	less	5	18	less
11-ER Flat	1	50	81	less	5	18	less
13-ER Flecked	3	50	81	less	5	18	less
14-FH Gray	8	50	81	less	5	18	expected
15-Gry/Brn/Grn	2	50	81	less	5	18	less
17-Owl Crk Black	17	50	81	less	5	18	expected
18-C Mottled	2	50	81	less	5	18	less
19-C Dr Gray	10	50	81	less	5	18	expected
22-C Mott/Flecks	4	50	81	less	5	18	less
28-Table Rock Flat	2	50	81	less	5	18	less
Total Indet	927	50	81	more	na	na	na

Feature 4 is located on the west side of the unnamed drainage across from F 3. Test pit 2 was placed in F 4 and excavated to 200 cmbs (Figure 6.68). Based on exposed cultural material along a tank trail and in the profile of TP 2, F 4 is a burned rock midden measuring at least 35 m long x 10 m wide x 60 cm thick. A high density of debitage and burned rock was recovered from each level excavated through the feature from 0 to 60 cmbs. Within TP 2, F 4 was composed of a gray clay loam containing 453 relatively small, angular, burned rocks (20.5 kg total). The frequencies of burned rock within the midden were low in the upper level, peaked in the central levels, and decreased toward the base. Other artifacts recovered from the feature included high frequencies of debitage, a few bone fragments and mussel shells, an Ellis point at 17 cmbs, an Edgewood at 25 cmbs, a Godley point at 27 cmbs, and a Castroville point at 29 cmbs. Although portions of the feature have been exposed in a tank trail and the surface of the feature has been impacted by vegetation clearing, the majority of the feature appears to be undisturbed in the profile of TP 2. A radiocarbon age of 1730 ± 60 BP (Beta b-70039) was obtained on charcoal from Level 5, near the base of the feature. Below F 4, a few flakes and burned rocks were recovered from each level excavated from 60 to 130 cmbs. In addition, a radiocarbon age of 1690 ± 60 (Beta b-70037) was obtained from below the feature in Level 8. Although these two ages are stratigraphically reversed, they overlap at 1 sigma, indicating that they are statistically identical. Collectively, they suggest that (1) the feature is of Late Archaic age, and post dates the initial formation of F 3 by more than 1,000 years, and (2) the feature was formed on a surface that was still actively aggrading, albeit in the last stages prior to renewed incision. From 130 cmbs to the base of the test pit, an occasional burned rock, flake, or ecofact was found.

Test pit 3 was placed at the western edge of the site boundary and excavated to 140 cmbs. Few cultural materials were recovered from TP 3.

Trench 6 was excavated at the west side of the confluence of Cowhouse Creek and the unnamed tributary. An ash lens was observed approximately 20 cmbs in the west profile of the trench. Test pit 6 was placed above the ash lens, on the west wall of BT 6, and excavated to 150 cmbs. This test pit produced very little cultural material, with total recovery consisting of one burned rock each from 0 to 10 cmbs and 10 to 20 cmbs. The ash lens occurred at 20 to 30 cmbs. The bottom of the lens appeared to be well fired and the remaining portions of it indicated an approximate diameter of 50 cm. Although the majority of the upper 20 cm of the site has been disturbed by vegetation clearing and no cultural material was found in direct association with the ash lens, a determination of whether or not the ash was a natural or cultural anomaly could not be made.

Six projectile points reflecting a Late Archaic/Transitional Archaic time period, and thus dovetailing nicely with the radiocarbon data, are present in this assemblage (Table 6.84). The chert varieties represented are almost evenly split between the Southeast Range and North Fort provinces. The general chipped stone assemblage consists of a multiple platform core, and mostly unifacially modified tools (Table 6.85).

Twelve identified chert types and eight indeterminate chert categories were included in the debitage assemblage recovered from AU 2 (Table 6.86). Approximately 22% of the assemblage was identified. When the entire assemblage was considered, the aggregate indeterminates and Fort Hood Yellow occurred in greater than expected frequency, and the remainder of identified types occurred in less than expected frequency. When the indeterminates were excluded from consideration, Fort Hood Yellow and Heiner Lake Tan occurred in greater than expected frequency; Heiner Lake Translucent Brown and Owl Creek Black occurred in expected frequencies; and Cowhouse White, Anderson Mountain Gray, Fossiliferous Pale Brown, Heiner Lake Blue, East Range Flecked, Gray/Brown/Green, Cowhouse Mottled/Flecked, Cowhouse Mottled/Banded, and Table Rock Flat occurred in less than expected frequencies (Table 6.87).

All four chert provinces are represented in the assemblage. The dominant province is North Fort,

Table 6.82 Debitage Cortex Characteristics by Material Type, AU 1, 41CV960.

	Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types						
02-C White	0	0	0	1	0	1
03-AM Gray	0	1	0	1	0	2
05-Texas Novac	0	0	0	1	0	1
06-HL Tan	2	1	0	42	0	45
08-FH Yellow	1	0	0	70	0	71
09-HL Tr Brown	1	1	0	12	0	14
10-HL Blue	0	0	0	1	0	1
11-ER Flat	1	0	0	0	0	1
13-ER Flecked	0	1	0	2	0	3
14-FH Gray	0	0	0	8	0	8
15-Gry/Brn/Grn	0	0	1	1	0	2
17-Owl Crk Black	1	0	0	16	0	17
18-C Mottled	0	0	0	2	0	2
19-C Dr Gray	1	0	0	7	0	8
22-C Mott/Flecks	1	2	0	3	0	6
28-Table Rock Flat	0	0	0	2	0	2
Subtotal	*8*	*6*	*1*	*169*	*0*	*184*
Unidentified Types						
Indet Black	0	0	0	30	0	30
Indet Dk Brown	0	1	0	157	3	161
Indet Dk Gray	4	1	0	85	2	92
Indet Lt Brown	16	10	12	306	1	345
Indet Lt Gray	3	1	6	71	0	81
Indet Misc.	16	0	3	108	25	152
Indet Mottled	4	0	0	4	4	12
Indet Trans	2	0	2	24	0	28
Indet White	1	1	0	24	0	26
Subtotal	*46*	*14*	*23*	*809*	*35*	*927*
Total	**54**	**20**	**24**	**978**	**35**	**1111**

Table 6.83 Faunal Recovery, AU 1, 41CV960.

	Element									
Vertebrates	Accessory carpal	Dermal armor	Fused 3&4th metata	Indeterminate	Peripheral	Podial	Tibia	left	right	Total
Artiodactyla	1	0	1	0	0	0	0	0	0	2
Dasypus novemcinctus	0	1	0	0	0	0	0	0	0	1
Mammalia	0	0	0	11	0	0	0	0	0	11
Mammalia (med/lg)	0	0	0	53	0	1	0	0	0	54
Odocoileus sp.	0	0	0	0	0	0	1	0	0	1
Testudinata	0	0	0	0	1	0	0	0	0	1
Vertebrata	0	0	0	12	0	0	0	0	0	12
Total	**1**	**1**	**1**	**76**	**1**	**1**	**1**	**0**	**0**	**82**
Bivalves										
Amblema plicata	0	0	0	0	0	0	0	2	1	3
Ambleminae	0	0	0	0	0	0	0	12	12	24
Lampsilinae	0	0	0	0	0	0	0	3	12	15
Lampsilis hydiana	0	0	0	0	0	0	0	2	0	2
Toxolasma sp.	0	0	0	0	0	0	0	1	0	1
Tritigonia verrucosa	0	0	0	0	0	0	0	0	1	1
Unionacea	0	0	0	0	0	0	0	2	2	4
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**22**	**28**	**50**

which is represented by three types that comprise 66% of the identified assemblage. Of these three types, Fort Hood Yellow is the most important, and comprises 61% of the identified total. The Southeast Range is also well represented, with five types that comprise 25% of the identified total, while the Cowhouse province is represented by three types that comprise approximately 3.5% of the identified total. West Fort materials represent only about 2% of the identified assemblage. Indeterminates are dominated by light brown and dark brown flakes (27% and 22% of the total assemblage, respectively).

As in AU 1, the assemblage is dominated by relatively small, decortified flakes. Over 85% are smaller than 1.8 cm, and only 2% are larger than 2.6 cm (Table 6.86). Almost 93% of the total assemblage is decortified, and no primary decortification flakes were recovered (Table 6.88). This suggests that intermediate and latter-stage lithic reduction was the most important stage of tool production practiced at the site. Only 11% of the recovered cortical flakes are clearly unabraded, suggesting that the majority of the relatively small assemblage of early-stage flakes was produced from raw material procured from the adjacent streambed.

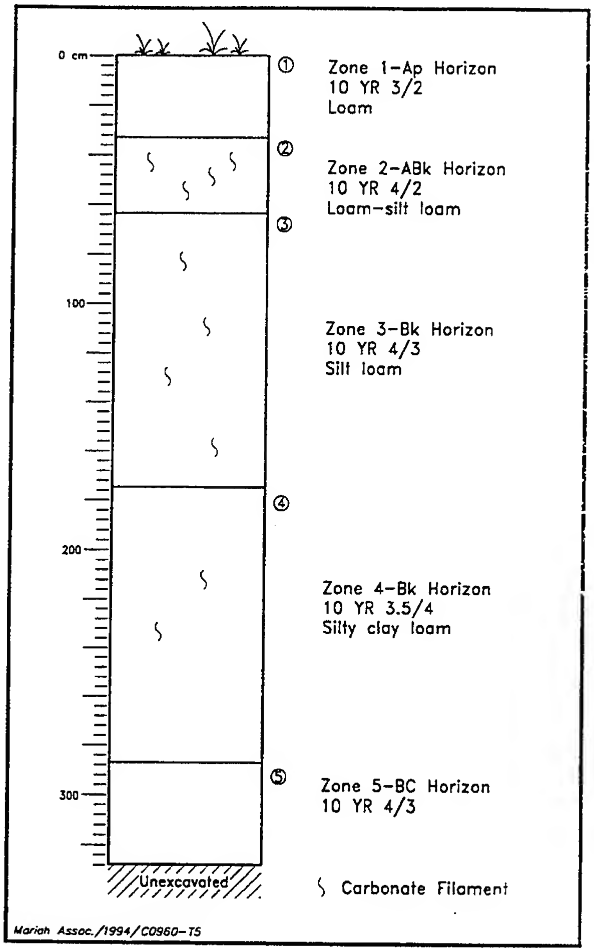

Figure 6.67 Measured Section of BT 5, 41CV960.

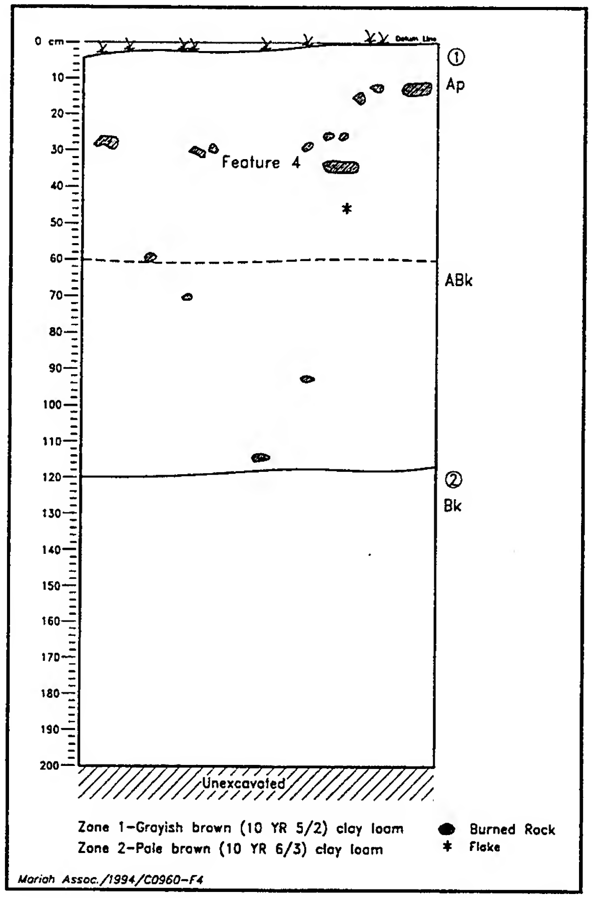

Figure 6.68 Profile of South Wall, TP 2, 41CV960.

Table 6.84 Projectile Points, AU 2, 41CV960.

	Lithic Material					
Point Type	06-HL Tan	08-FH Yellow	15-Gry/Brn/Grn	17-Owl Crk Black	Indet Lt Gray	Total
Castroville	0	0	1	0	1	2
Edgewood	1	0	0	0	0	1
Ellis	0	1	0	0	0	1
Godley	1	0	0	0	0	1
Pedernales	0	0	0	1	0	1
Total	**2**	**1**	**1**	**1**	**1**	**6**

Table 6.85 Lithic Tools, AU 2, 41CV960.

	Core Type	Tool Type				
Lithic Material	multiple platform	complex scraper	end scraper	late stage biface	uniface	Total
06-HL Tan	0	0	1	0	1	2
09-HL Tr Brown	0	0	0	1	0	1
14-FH Gray	0	1	0	0	0	1
15-Gry/Brn/Grn	1	0	0	0	1	2
17-Owl Crk Black	0	0	0	1	0	1
18-C Mottled	0	0	0	0	1	1
Indet Dk Brown	0	0	0	0	1	1
Indet Lt Brown	0	0	0	1	1	2
Total	**1**	**1**	**1**	**3**	**5**	**11**

A small faunal assemblage was recovered from AU 2 (Table 6.89). Recovered taxa include deer and indeterminate deer-sized animals and a minimum of two mussel taxa (Ambleminae and *Quadrula*). Once again, the relatively low recovery of the highly durable mussel remains suggest that despite the proximity of Cowhouse Creek, mussels probably played a relatively minor role in the subsistence strategy practiced at the site.

6.9.2.3 Site-Level Synthesis

The majority of the cultural material detected at 41CV960 occurred in the top meter of the solum, in the A, AB, and Bk1 horizons. This suggests that the majority of the occupation occurred during the latter portions of the fill events while the surface became increasingly stable. The available radiocarbon data suggests that the entire site is underlain by late Holocene West Range alluvium, although Fort Hood alluvium may be present at depth. However, the difference in ages and diagnostic artifacts obtained from the eastern and western portions of the site suggest that the former is probably principally underlain by lower West Range alluvium, and was stabilizing roughly 3000 BP, while the latter is underlain by upper West Range alluvium and was deposited up to 1,000 to 1,500 years later. The features appear to represent both large, probably palimpsest burned rock features and smaller, relatively discrete hearths, both of which appear to date from the latter Middle Archaic through the Late Archaic. There is also some indication that a Late Prehistoric occupation was originally present at or near the surface in AU 1, but this component appears to have been completely destroyed by plowing. The recovered lithic assemblage represents procurement primarily from the relatively distant North Fort and Southeast Range chert provinces, with surprisingly little contribution from the adjacent Cowhouse Creek channel.

Table 6.86 Debitage Recovery by Size and Material Type, AU 2, 41CV960.

Lithic Material	Size (cm) < 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types							
03-AM Gray	0	0	1	2	0	0	3
06-HL Tan	0	20	6	2	5	4	37
07-Foss Pale Brown	0	0	1	1	0	0	2
08-FH Yellow	4	15	58	4	22	2	105
09-HL Tr Brown	0	0	0	6	0	0	6
10-HL Blue	0	0	0	0	0	1	1
13-ER Flecked	0	0	2	0	0	0	2
15-Gry/Brn/Grn	0	0	1	0	1	0	2
17-Owl Crk Black	0	5	2	0	0	0	7
22-C Mott/Flecks	0	0	0	1	0	0	1
23-C Mott/Banded	0	0	0	0	0	1	1
28-Table Rock Flat	0	0	2	2	0	0	4
Subtotal	*4*	*40*	*73*	*18*	*28*	*8*	*171*
Unidentified Types							
Indet Black	2	0	7	4	1	0	14
Indet Dk Brown	0	31	87	43	9	1	171
Indet Dk Gray	3	20	2	10	7	0	42
Indet Lt Brown	9	77	48	63	6	5	208
Indet Lt Gray	0	10	10	6	28	2	56
Indet Misc.	7	40	10	23	16	0	96
Indet Mottled	0	0	0	1	2	1	4
Indet White	0	0	5	0	1	0	6
Subtotal	*21*	*178*	*169*	*150*	*70*	*9*	*597*
Total	**25**	**218**	**242**	**168**	**98**	**17**	**768**

6.9.3 Conclusions and Recommendations

Features 3 and 4 are large middens that are mostly intact despite probable plow or other disturbance to the upper 20 cm. The preservation of moderate faunal assemblages that include both bone and mussel shells implies that these features have the potential to address subsistence issues outlined in the research design for Fort Hood (Ellis et al. 1994). The presence of substantial lithic assemblages in these features implies a high potential for identifying technological systems (including burned rock technologies) associated with subsistence resources (per Ellis 1994). The presence of features and artifacts below the bottom elevation of F 3 implies that stratified occupations

Table 6.87 Binomial Statistic Results, AU 2, 41CV960.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
03-AM Gray	3	45	74	less	7	21	less
06-HL Tan	37	45	74	less	7	21	more
07-Foss Pale Brown	2	45	74	less	7	21	less
08-FH Yellow	105	45	74	more	7	21	more
09-HL Tr Brown	6	45	74	less	7	21	less
10-HL Blue	1	45	74	less	7	21	less
13-ER Flecked	2	45	74	less	7	21	less
15-Gry/Brn/Grn	2	45	74	less	7	21	less
17-Owl Crk Black	7	45	74	less	7	21	expected
22-C Mott/Flecks	1	45	74	less	7	21	less
23-C Mott/Banded	1	45	74	less	7	21	less
28-Table Rock Flat	4	45	74	less	7	21	less
Total Indet	597	45	74	more	na	na	na

are present at depth in what is likely to be a slowly aggrading depositional context.

On the basis of the foregoing, site 41CV960 is judged to be significant and eligible for inclusion in the NRHP by virtue of its capacity to yield data that might address significant research issues. Accordingly, this portion of the site should be preserved and protected from adverse impacts. Because some of the known eligible components are shallowly buried, protection measures should include efforts to prevent damage by tracked and wheeled vehicles. Protection efforts also should include measures to prevent subsurface disturbance due to vandalism and excavations conducted by military personnel.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1993. The current state of studies of the Early Archaic period should be especially carefully evaluated prior to any mitigation efforts because future developments in

Table 6.88 Debitage Cortex Characteristics by Material Type, AU 2, 41CV960.

	Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types						
03-AM Gray	0	0	0	3	0	3
06-HL Tan	3	0	0	34	0	37
07-Foss Pale Brown	0	0	0	2	0	2
08-FH Yellow	1	0	0	104	0	105
09-HL Tr Brown	0	0	0	6	0	6
10-HL Blue	0	0	0	1	0	1
13-ER Flecked	0	0	0	2	0	2
15-Gry/Brn/Grn	1	0	0	1	0	2
17-Owl Crk Black	0	0	0	7	0	7
22-C Mott/Flecks	0	0	0	1	0	1
23-C Mott/Banded	1	0	0	0	0	1
28-Table Rock Flat	0	0	0	4	0	4
Subtotal	*6*	*0*	*0*	*165*	*0*	*171*
Unidentified Types						
Indet Black	1	0	0	11	2	14
Indet Dk Brown	6	0	0	165	0	171
Indet Dk Gray	2	0	0	40	0	42
Indet Lt Brown	10	6	3	189	0	208
Indet Lt Gray	2	0	0	54	0	56
Indet Misc.	10	0	4	81	1	96
Indet Mottled	0	0	3	1	0	4
Indet White	1	0	0	5	0	6
Subtotal	*32*	*6*	*10*	*546*	*3*	*597*
Total	**38**	**6**	**10**	**711**	**3**	**768**

this topic area may alter the research value of more deeply buried assemblage at the site.

Mitigative data recovery may include up to 150 m^2 of manually excavated blocks and backhoe trenches to expose geoarcheologically relevant data. Block excavations should be concentrated largely in the areas around Fs 3 and 4, although some attention also should be paid to shallow occupations that may be associated with the ash lens at TP 6. Given an average depth of 1 m, manual block excavations that include only Fs 3 and 4 will total approximately 100 m^2. Given the presence of a 40 cm thick deposit of possible Early Archaic materials below Fs 3 and 4, another 40 m^2 of manual excavations may be needed, for a total of approximately 140 m^2 of manual excavations near these two features. Trenches should be placed near each feature to facilitate accurate placement of blocks and to sound for deep, stratigraphically discrete, occupations. Additional trenches should be placed in other locales (e.g., near TP 6) for sounding and to provide geoarcheological exposures, especially exposures that have the potential to reveal correlations between stratigraphic units. These trenches should be carefully monitored in order to avoid damage to currently unknown deposits that may be present. Note that alluvial deposits may be greater than 6 m deep. Because sounding excavations to expose deeply buried occupations near Fs 3 and 4 would inflict serious, large-scale damage on known significant cultural materials, such sounding excavations should be carefully sequenced into mitigation efforts. In the event that additional cultural deposits are discovered during sounding near the features or in other locales (which is very possible), then another 50 m^2 (or more) of manual excavations may be necessary, for a total of up to approximately 190 m^2 of manual excavations at the site. Whenever possible, carefully monitored mechanical excavation should be used to remove overburden to avoid wasting effort on unproductive deposits.

Table 6.89 Faunal Recovery, AU 2, 41CV960.

	Element					
Vertebrates	Antler	Fused 3&4th metata	Indeterminate	left	right	Total
Mammalia (med/lg)	0	0	17	0	0	17
Bivalves						
Ambleminae	0	0	0	4	1	5
Quadrula apiculata	0	0	0	1	0	1
Unionacea	0	0	0	0	1	1
Total	**0**	**0**	**0**	**5**	**2**	**7**

6.10 SITE 41CV1007

6.10.1 Introduction

In late July and early August 1993, Mariah conducted test excavations at site 41CV1007. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.10.1.1 Location and Description

Site 41CV1007 is located in the Shell Mountain area of Fort Hood. The site is a prehistoric open camp with two historic dams and irrigation ditches. The northeast and southwest boundaries of the site contain steep colluvial slopes, with gentler colluvial slopes near a drainage that bisects the center of the site on a northwest-southeast axis (Figure 6.69). The floodplain of the drainage opens to the northwest where it expands into a box canyon and has created an alluvial fan. At the central and northwest portions of the site, two historic earthen dams, now completely silted in and

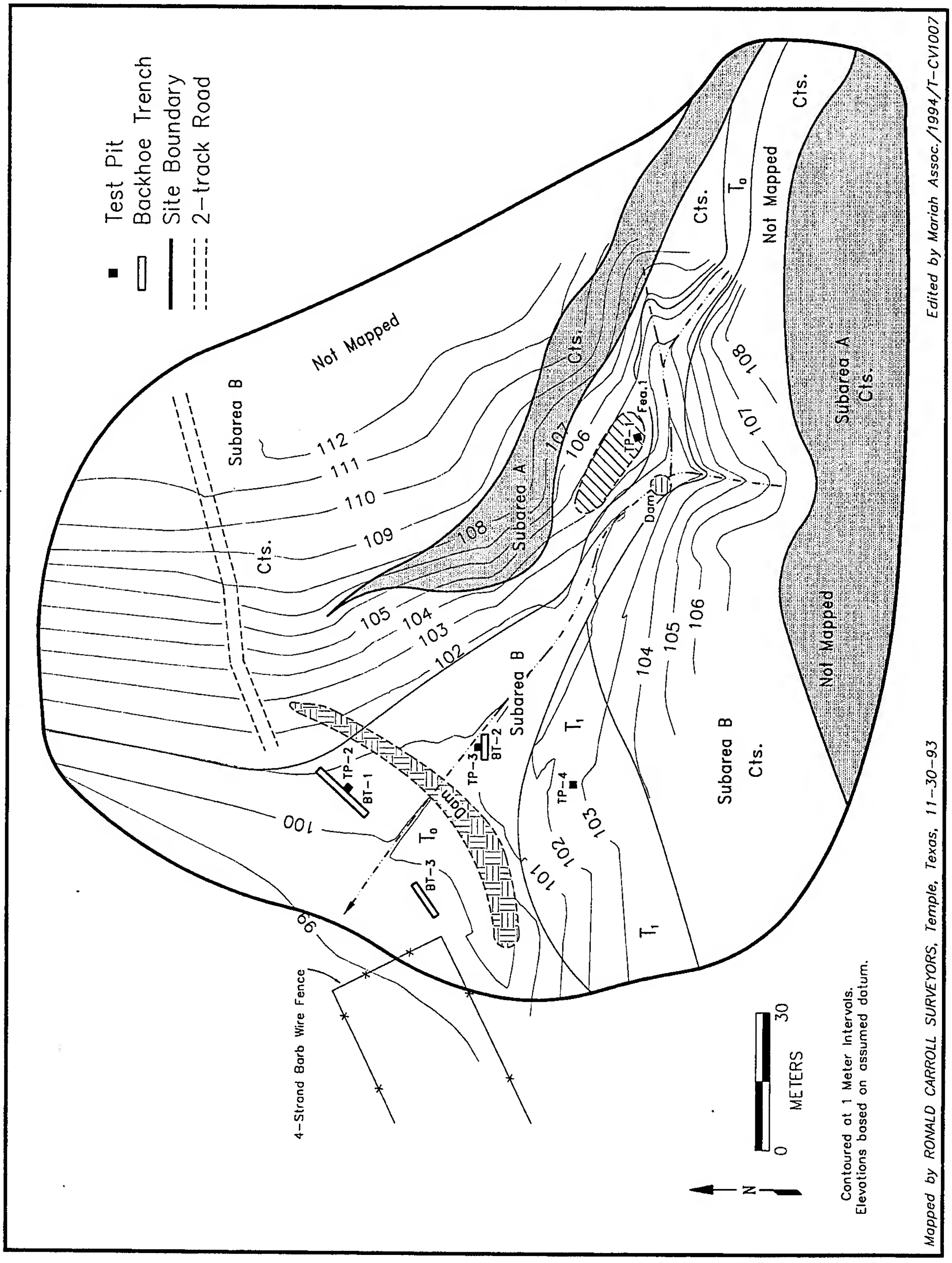

Figure 6.69 Site Map of 41CV1007.

cut through by channel entrenchment, are present. Each dam is associated with a nearby overflow channel ditch for irrigating the lower valley pastures. The upper dam is adjacent to an alluvial/colluvial terrace remnant that is completely covered by burned rock midden debris (F 1). The colluvial slopes are vegetated mainly with juniper and oak, and the floodplain is vegetated with oak and a dense understory of greenbriar and shrubs (Figure 6.70).

Figure 6.70 Overview of Site 41CV1007, Looking West.

6.10.1.2 Previous Work

The site was first recorded by Dureka and Mesrobian in 1986, who described it as a large burned rock midden severely disturbed by vandalism. Flakes, groundstone, an untyped arrow point, scrapers, bone, and mussel shell were observed in the vicinity, with an estimated 70% of the surface of the feature vandalized.

The site was visited by Quigg, Truesdale, and Frederick on 25 March 1992, who completed archeological and geomorphological assessments indicating potential for buried cultural material. Two subareas were defined for the site. Subarea A consisted of Holocene terraces and Subarea B was the colluvial slopes. No further work was recommended for Subarea B. A shovel testing crew returned to the site on 13 April 1992 and excavated nine shovel tests (STs 1 through 9) on Subarea A. These tests ranged in depth from 20 to 50 cmbs, except for ST 9 in F 1, which was excavated to 80 cmbs. Four of eight shovel tests were negative, with the remaining four tests producing only 12 flakes and two mussel shell fragments from 0 to 40 cmbs. The shovel test in F 1 reached a depth of 80 cmbs, but did not reach the bottom of cultural deposits. Burned rocks, lithics, bone, and mussel shell were recovered from ST 9. The eligibility status of the site was uncertain after shovel testing. The site was recommended for avoidance or formal testing if avoidance was not possible. One to three backhoe trenches and four to six 1 x 1 m of manually excavated units were recommended for formal testing (Trierweiler 1994:A1145-A1150).

6.10.1.3 New Work

Because the site is situated within an endangered species habitat area, clearance for archeological testing was obtained from Gil Eckrich (Fish and Wildlife, DEH) prior to backhoe trenching the site. Testing for NRHP evaluation consisted of the excavation of three backhoe trenches (BTs 1 through 3) and four 1 x 1 m test pits (TPs 1 through 4) (Table 6.90). Backhoe trench 2 was situated upstream of the larger dam near the restriction in the canyon, while BT 1 and BT 3 were situated downstream of the dam on either side of the incised channel. Trench 1 was located along the fan margin at the foot of a colluvial

slope and was excavated toward the valley axis to the south. The other trench, BT 3, was located south of the channel and between the western diversion dam and the east side of a corral. Test pit 1 was placed on F 1, TP 2 and TP 3 were offset from BT 1 and BT 2, respectively, and TP 4 was placed on the first terrace above the lower historic dam. A total of 7.3 m^2 was manually excavated on the site. Recovered cultural material is summarized in Table 6.91.

6.10.2 Results

For analytical purposes, the site was subdivided into two distinct analytical units. Analytical Unit 1 consists of the excavations on the terrace around the lower diversion dam, and AU 2 consists of the midden situated further upstream. Each of these gross subdivisions is addressed separately below.

6.10.2.1 Excavations in the Terrace

Three trenches were excavated in AU 1. The drainage which bisects the site forms a broad, low relief alluvial fan at the mouth of the small canyon. The restricted size and dense vegetation of this small canyon precluded mechanical excavation and examination of the deposits very far beyond the first (westernmost) diversion dam. The stratigraphy revealed by the trenches was impressively complex and highly variable spatially. Approximately five alluvial fills were observed in the trenches which were numbered in consecutive order from oldest to youngest.

Trench 1 (Figure 6.71) was excavated from the valley margin and exhibited at least two alluvial fills which thickened to the south. Near the middle of the trench, the upper fill, Unit 4 (interpreted as the Ford Alluvium of Nordt 1992), was about 120 cm thick and exhibited an A-Bwk-C soil profile. This alluvium was normally graded, and consisted of a white (10YR 8/3), slightly gravelly to gravelly sandy loam at the base and graded to a black silt loam to silty clay loam near the surface. A single burned rock feature (F 2) was observed within this trench between

Table 6.90 List of Treatment Units, 41CV1007.

AU	Treatment Unit	Length (m)	Width (m)	Depth (m)
1	BT 1	15	1.5	180
1	BT 2	8	1.5	380
1	BT 3	10	1.5	385
1	TP 2	1.0	1.0	90
1	TP 3	1.0	1.0	220
1	TP 4	1.0	1.0	180
2	TP 1	1.0	1.0	250

approximately 75 and 80 cmbs, near the base of the dark grayish brown (10YR 4/2), Bwk horizon. At the northern end of the trench, this fill rested upon limestone bedrock, but near midtrench, the limestone dipped steeply to the south and another fill was observed beneath Unit 4. This older fill, tentatively identified as Unit 1 (the Georgetown Alluvium of Nordt 1992), consisted of a yellowish brown (10YR 5/4), slightly gravelly loam. No cultural material was observed in this lower unit.

Test pit 2 was placed above the burned rock concentration observed in BT 1. The upper two levels were culturally sterile and only a few flakes were found from 20 to 40 cmbs, but frequencies increased markedly from 40 to 60 cmbs, with several flakes and burned rocks recovered from each level. Feature 2, a burned rock concentration that extended beyond the limits of TP 2 in all directions was encountered from 63 to 81 cmbs. A total of 62 subangular burned rocks (totaling 40.5 kg) as recovered from the feature. No pattern was discerned in the rocks, and no basin was apparent either in profile or from the base elevations of the rocks. Only a slight soil discoloration could be found around the rocks. The feature is located on the edge of a buried cut-and-fill episode of the nearby drainage, but does not dip in the direction of the gully. The feature contained the majority of burned rock found in TP 2 and a dart point base and a flake were found in association with the feature. No cultural material was found from 80 to 90 cmbs.

Table 6.91 Artifact Recovery by Test Pit, 41CV1007.

	None					TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
surface	0	0	0	2	0(0)	0	0	0	1	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
1						22	20	222	6	100(32)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
2						15	30	316	7	300(25.5)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	1	0(0)
3						5	29	198	4	143(41)	0	0	3	0	0(0)	0	0	1	0	0(0)	0	0	4	0	0(0)
4						1	24	151	4	150(21)	0	0	1	0	0(0)	0	4	6	0	0(0)	0	0	7	0	0(0)
5						10	33	173	2	120(180)	0	0	10	0	0(0)	0	13	0	0	0(0)	0	0	4	0	0(0)
6						6	52	229	3	150(20)	0	0	4	0	8(1)	0	3	1	0	0(0)	0	0	1	0	0(0)
7						39	71	310	6	149(41)	0	0	2	1	48(27.5)	0	2	14	0	0(0)	0	0	1	0	0(0)
8						9	16	201	2	40(7)	0	0	0	0	14(13)	0	1	13	3	0(0)	0	0	1	0	0(0)
9						0	0	11	0	0(0)	0	0	0	0	0(0)	0	0	9	0	0(0)	0	0	4	0	0(0)
10						0	0	2	0	0(0)						0	2	0	0	2(0.2)	0	0	0	0	0(0)
11						0	0	3	0	0(0)						0	1	0	0	2(0.8)	0	0	0	0	0(0)
12						0	1	68	2	12(3)						0	0	0	0	0(0)	0	0	0	0	0(0)
13						0	0	51	0	7(2.5)						0	0	1	0	4(0.3)	0	0	0	0	0(0)
14						0	0	3	0	0(0)						0	0	2	0	2(0.2)	0	0	0	0	0(0)
15						0	0	2	0	0(0)						0	0	3	1	2(0.4)	0	0	0	0	0(0)
16						0	0	1	0	0(0)						0	0	0	0	0(0)	0	0	0	0	0(0)
17						0	0	0	0	0(0)						0	2	1	0	1(0.5)	0	0	0	0	0(0)
18						0	0	1	0	0(0)						0	1	0	0	0(0)	0	0	0	0	0(0)
19						0	0	0	0	0(0)						0	0	1	0	0(0)	0	0	0	0	0(0)
20						0	0	0	0	0(0)						0	3	1	0	0(0)					
21						0	0	0	0	0(0)						0	4	1	0	0(0)					
22						0	0	4	0	0(0)						0	6	0	0	0(0)					
23						0	0	2	0	0(0)															
24						0	0	1	0	0(0)															
25						0	0	0	0	0(0)															
TOTAL	0	0	0	2	0(0)	107	276	1949	37	1171(373)	0	0	20	1	70(41.5)	0	42	54	4	13(2.4)	0	0	22	1	0(0)

The second trench, BT 2, exhibited two major alluvial units, presumably Unit 1 (Georgetown) and Unit 4 (Ford), and a thin veneer of historic sediment (Unit 5) (Figure 6.72). The top 20 cm consisted of a very dark grayish brown, silty clay loam interpreted as sediment accumulated behind the historic diversion dam. It rested unconformably on 2 to 3.5 m of a dark colored alluvial fill (Unit 4, Ford Alluvium) containing cultural material, most often in secondary context. This fill thickened considerably even within this short trench. At least three normally graded (fining upward) cycles of sedimentation were apparent in this fill, each consisting of a coarse basal deposit (gravel, muddy gravel, slightly gravelly clay loam) and a black (10YR 3/1 to N2/0), finer upper facies (clay loam, sandy clay, and slightly gravelly clay). The lowest of the channel deposits was unconformably inset into an older alluvial fill which was composed of dark yellowish brown (10YR 4/4) to brown-dark brown (10YR 4/3), gravelly to slightly gravelly clay or clay loam inferred to be Unit 1 (Georgetown).

Test pit 3 was offset from BT 2 and excavated to 220 cmbs. The upper two levels of the test pit were culturally sterile and a single flake was found from 20 to 30 cmbs. The majority of artifacts within the test pit were recovered from 30 to 90 cmbs, with each level containing several flakes and/or bone fragments. In addition to these artifacts, an arrow point was found at 70 to 80 cmbs, bolstering the interpretation of the upper fill as Ford Alluvium. A few items continued to be found in each level from 90 to 150 cmbs. The types of artifacts found within these levels included small burned rocks (less than 0.75 kg in any given level), flakes, and small bone fragments. The following level was culturally sterile, and again, a few of the above described types of artifacts were found from 160 to 220 cmbs. Excavation of TP 3 was halted at 220 cmbs because it was determined that the majority of the cultural material being encountered from the unit was redeposited, perhaps even from the terrace containing F 1. Each concentration of cultural material in TP 3 was associated with a dense gravel zone of probable

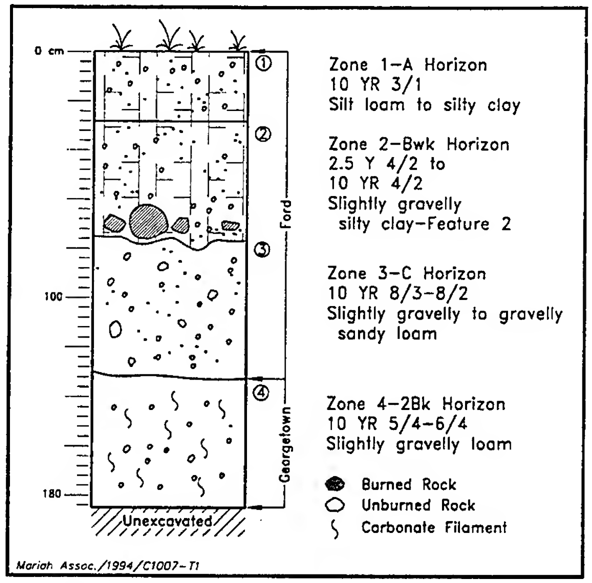

Figure 6.71 Measured Section, BT 1, 41CV1007.

alluvial origin, implying that cultural materials are in redeposited context.

The third trench (BT 3) was situated in the valley axis downstream of the dam and above the head of the fan. It was excavated to a depth of 3.9 m and exposed a stratigraphic sequence consisting of four stratigraphic units which were superimposed in a complex fashion. Figure 6.73 presents a compressed, schematic illustration of the exposed stratigraphy. The basal unit (Georgetown) was present between 200 and 380 cmbs and exhibited an Akssb-Bkb soil profile. The Akssb horizon was infrequently preserved and truncated toward the north (the valley axis). The unit fined upward from a yellowish brown (10YR 5/6), slightly gravelly loam to a very dark grayish brown (10YR 3/2), loam or silty clay loam. This deposit was unconformably overlain by a brown (10YR 5/3) deposit (Unit 2; tentatively interpreted as the Fort Hood fill of Nordt 1992) that ranged in depth from 70 cmbs to 200 cmbs and was inversely graded; being a gravel to a gravelly mud near the top of the unit, and a clay to silty clay below 120 cmbs. Both of these facies exhibited significant secondary carbonate and were considered to be stage II calcic (Bkb) horizons.

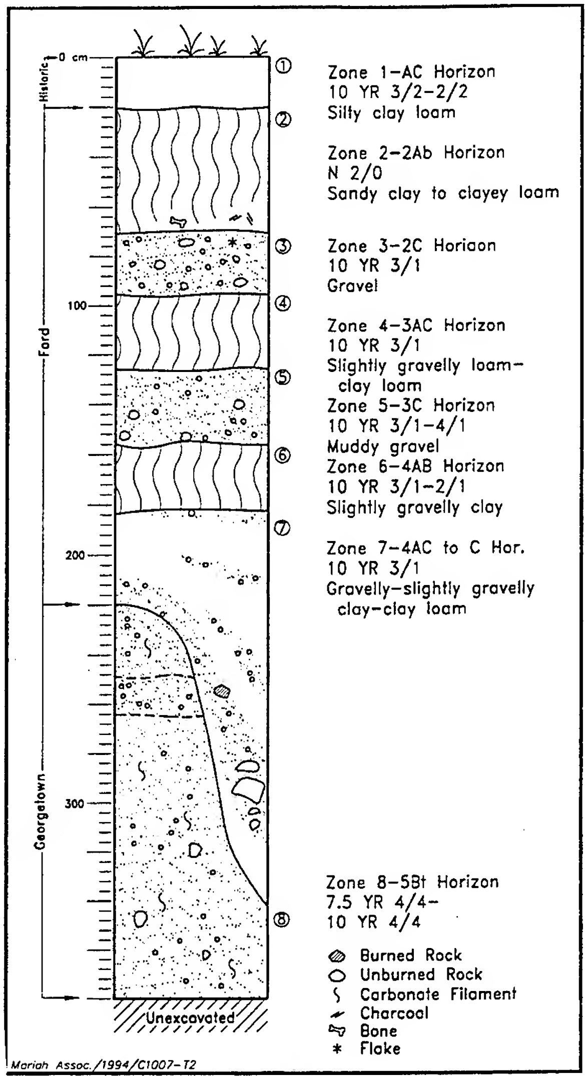

Figure 6.72 Measured Section (Compressed), BT 21, 4CV1007.

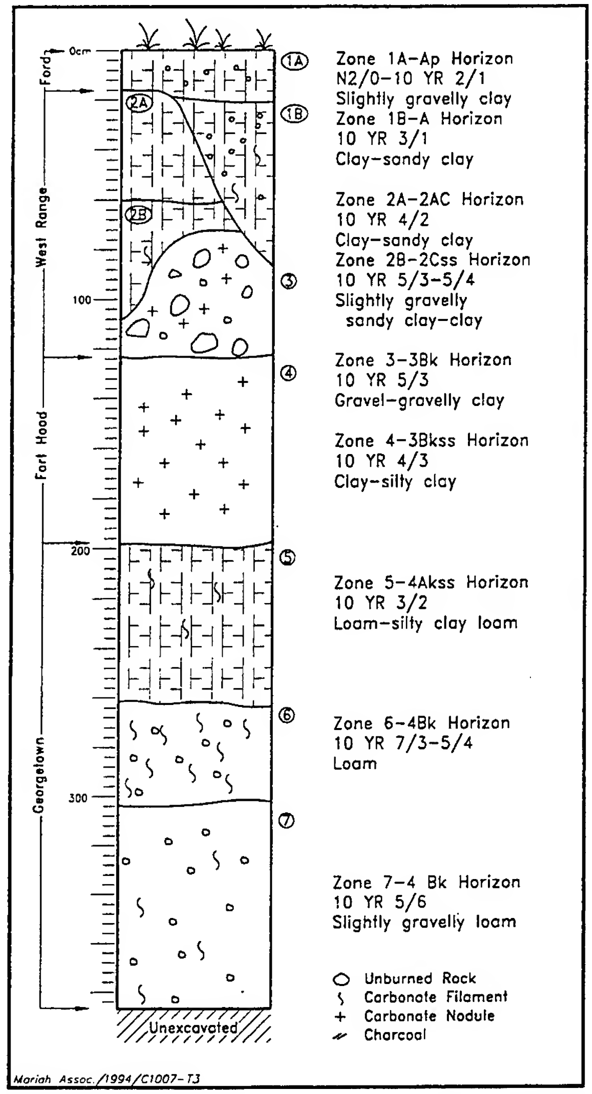

Figure 6.73 Measured Section (Compressed), BT 3, 41CV1007.

The fine-grained facies decreased in thickness to the north, but the gravelly facies increased in thickness toward the valley axis. The absence of a complete soil profile suggests that significant portions of Unit 2 have been removed by erosion. Unconformably resting upon Unit 2 was a veneer (less than 90 cm thick) of Unit 3 (tentatively interpreted as the West Range fill of Nordt 1992), which consisted of a brown (10YR 5/3) to dark grayish brown (10YR 4/2), fine-grained fill. This unit was normally graded, and fined upward from a slightly gravelly sandy clay, to a clay or a sandy clay. This deposit thickened to the south and was abruptly truncated by a dark colored (black; 10YR 3/1) fine-grained alluvial fill (Unit 4) to the north. The boundary between these two units (Unit 3 and Unit 4) was very undulatory and abrupt. Unit 4 (Ford) consisted of up to 1 m of clay, slightly gravelly clay, and sandy clay and exhibited pronounced structure. No cultural material was observed in this trench.

Test pit 4 was placed on the first terrace above the lower historic dam and excavated to bedrock (118 cmbs). Five stratigraphic zones were revealed in the unit profile. Zone 1 is a 20 cm thick, black

(10YR 2/1), clay loam. Zone 2 is a dark brown, silty clay loam (7.5YR 3/4) extending from 25 to 68 cmbs, with some unburned limestone cobbles. Zone 3 is a dark brown, silty clay loam (10YR 3/3) overlying a dense gravel lens. Zone 4 is under the gravel lens and is a very dark grayish brown, silty clay loam (10YR 3/2) extending from 90 to 115 cmbs. Zone 5 is a brown clay (10YR 4/3), with a small amount of gravel, which overlies limestone bedrock. Although the unit was not inspected by a geomorphologist and cannot be correlated with the stratigraphy described in the trenches, the TP 4 profile suggests the stratigraphy around the unit has not been mechanically disturbed. A total of 23 flakes was recovered from 30 to 90 cmbs (in Zones 2, 3, and 4), but no other artifacts were recovered from the test pit.

Only one untyped dart point and one untyped arrow point, representing two indeterminate chert types (Table 6.92) and eight lithic tools (Table 6.93) were recovered from this AU. The tools consist of five chert varieties. These tools contain both unifacial and bifacial modifications.

Five identified and nine indeterminate categories of chert were included in the debitage assemblage recovered from AU 1 (Table 6.94). Approximately 20% of the assemblage was identified. When the entire assemblage was considered, the aggregate indeterminates occurred in greater than expected frequency; and the identified types occurred in less than expected frequencies. When the indeterminates were excluded, all the identified types occurred in expected frequencies (Table 6.95). Approximately 35% of the identified assemblage is composed of material types associated with the Southeast Range province, while the North Fort and West Fort are represented by 30% and 35%, respectively.

The size distribution of recovered flakes is relatively even. The modal peak is in the 1.2 to 1.8 cm range, which comprises 36% of the total, while the least represented sizes (0.5 to 0.9 cm and 2.6 to 5.2 cm) still represent 42% and 5% of the total. Although this distribution is suggestive of a number of different reduction stages, only 8% of the assemblage has preserved cortex, indicating that very little early-stage reduction is represented in the assemblage (Table 6.96).

A limited amount of faunal data, consisting exclusively of unidentified deer-sized and bison-sized mammals, was recovered from AU 1. No aquatic fauna, including shellfish, were recovered from AU 1 (Table 6.97).

Table 6.92 Projectile Points, AU 1, 41CV1007.

	Lithic Material		
Point Type	Indet Lt Brown	Indet White	Total
Other Arrow	1	0	1
Other Dart	0	1	1
Total	**1**	**1**	**2**

Table 6.93 Lithic Tools, AU 1, 41CV1007.

	Tool Type				
Lithic Material	drill	end scraper	uniface	utilized flake	Total
15-Gry/Brn/Grn	1	0	0	0	1
19-C Dr Gray	0	0	1	0	1
Indet Dk Brown	0	1	0	0	1
Indet Lt Brown	0	0	1	0	1
Indet Lt Gray	0	0	0	1	1
Total	**1**	**1**	**2**	**1**	**5**

6.10.2.2 Excavations in the Burned Rock Midden

One test pit (TP 1) was excavated in the burned rock midden (F 1) in the narrow, canyon-confined portion of the site. Feature 1 is about 29 m long x 14 m wide, and is restricted to a small terrace on the east side of a tributary of Two Year Old Creek. Approximately 50 to 70% of the surface of the feature has been impacted by vandalism, some possibly within the last six months of formal testing, as no vegetation has grown from some of the spoil dirt piles. Part of an abandoned wooden screen and mesh were also found on the midden. At the junction of the colluvial toeslope and the terrace, is a linear depression, the result of several potholes placed where the runoff further erodes the midden and exposes cultural material.

The profile of the south wall of TP 1 contained ten stratigraphic zones (Figures 6.74 and 6.75). The uppermost zone consisted of approximately 30 cm of spoil from the vandal holes. The midden is developed in rhythmically bedded, gravelly clay loams and loamy gravels that represent a sequence of rapid fining-upward cycles in the confined canyon. At least two and possibly three major fills are present in the section. The upper fills exhibit only weak soil development, suggesting that they are of late Holocene age (e.g., the Ford Alluvium of Nordt 1992), while the lower portion of the profile contains significant filamental carbonate and may be equivalent to the Fort Hood and/or Georgetown fills.

Table 6.94 Debitage Recovery by Size and Material Type, AU 1, 41CV1007.

	Size (cm)					
Lithic Material	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types						
03-AM Gray	0	0	1	2	3	6
06-HL Tan	0	2	1	2	1	6
08-FH Yellow	0	1	3	0	0	4
10-HL Blue	0	0	0	1	0	1
15-Gry/Brn/Grn	0	0	0	2	0	2
Subtotal	*0*	*3*	*5*	*7*	*4*	*19*
Unidentified Types						
Indet Black	0	0	2	0	0	2
Indet Dk Brown	1	3	1	0	0	5
Indet Dk Gray	1	2	2	0	0	5
Indet Lt Brown	7	9	8	4	1	29
Indet Lt Gray	2	2	3	1	0	8
Indet Misc.	2	2	8	1	0	13
Indet Mottled	0	0	2	3	0	5
Indet Trans	0	2	0	0	0	2
Indet White	1	3	4	0	0	8
Subtotal	*14*	*23*	*30*	*9*	*1*	*77*
Total	**14**	**26**	**35**	**16**	**5**	**96**

Table 6.95 Binomial Statistic Results, AU 1, 41CV1007.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Maximum	Expected Maximum	Results	Expected Maximum	Expected Maximum	Results
03-AM Gray	6	9	23	less	1	7	expected
06-HL Tan	6	9	23	less	1	7	expected
08-FH Yellow	4	9	23	less	1	7	expected
10-HL Blue	1	9	23	less	1	7	expected
15-Gry/Brn/Grn	2	9	23	less	1	7	expected
Total Indet	77	9	23	more	na	na	na

Table 6.96 Debitage Cortex Characteristics by Material Type, AU 1, 41CV1007.

	Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types						
03-AM Gray	0	0	0	6	0	6
06-HL Tan	0	1	0	5	0	6
08-FH Yellow	0	0	0	4	0	4
10-HL Blue	0	0	0	1	0	1
15-Gry/Brn/Grn	1	0	0	1	0	2
Subtotal	*1*	*1*	*0*	*17*	*0*	*19*
Unidentified Types						
Indet Black	0	0	0	2	0	2
Indet Dk Brown	0	0	0	5	0	5
Indet Dk Gray	0	0	0	5	0	5
Indet Lt Brown	0	1	0	27	1	29
Indet Lt Gray	0	0	1	7	0	8
Indet Misc.	0	0	1	12	0	13
Indet Mottled	0	0	3	2	0	5
Indet Trans	0	0	0	2	0	2
Indet White	0	0	0	8	0	8
Subtotal	*0*	*1*	*5*	*70*	*1*	*77*
Total	**1**	**2**	**5**	**87**	**1**	**96**

Table 6.97 Faunal Recovery, AU 1, 41CV1007.

	Element				
Vertebrates	Astagalus	Calcaneus	Indeterminate	Tibia	Total
Artiodactyla	2	1	0	1	4
Mammalia	0	0	9	0	9
Mammalia (med/lg)	0	0	25	0	25
Mammalia (very lg)	0	0	1	0	1
Vertebrata	0	0	3	0	3
Total	**2**	**1**	**38**	**1**	**42**

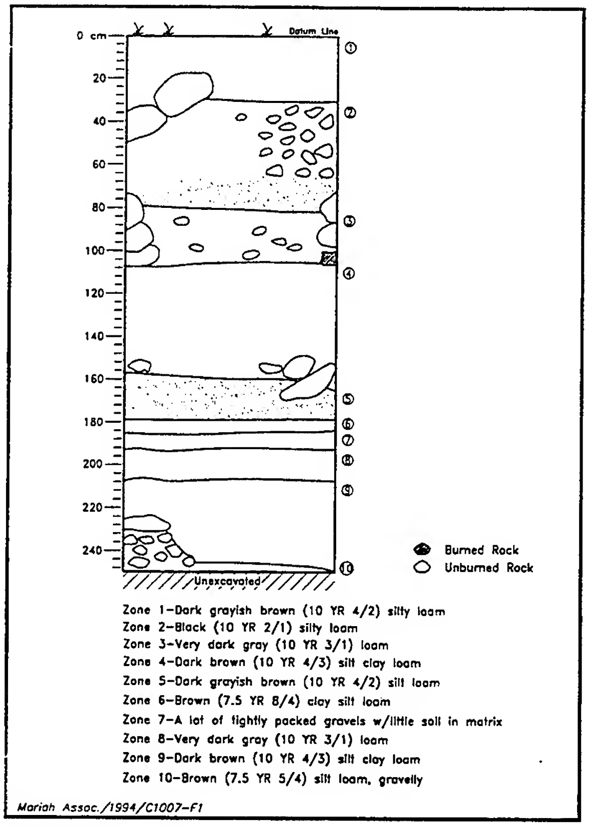

Figure 6.74 Profile of South Wall, TP 1, 41CV1007.

Three projectile point bases (Castroville and Edgewood dart points and a Sabinal arrow point) were found from 10 to 20 cmbs, implying that there is a Transitional Archaic to Late Prehistoric component at the site (Turner and Hester 1985). Because these points were incomplete, they were probably discarded by the vandals. From 20 to 80 cmbs, each level within the midden contained extremely high frequencies of flakes and burned rocks and numerous bone fragments and mussel shells, in addition to a Lange and untyped dart point in levels 6 and 7, respectively. Substantial numbers of snails (mainly *Rabdotus* sp.) also were recovered from each level. Below the upper disturbed levels, from 20 to 80 cmbs, burned rock counts were fairly uniform, although no internal patterning was recognized. A total of approximately 1,157 burned rocks (367 kg) were recovered from these levels. A Scallorn point was found from 70 to 80 cmbs, near the base of the

feature, supporting the interpretation that the deposits are of late Holocene age. Other items recovered from these levels include a worked, polished shell pendant fragment from 40 to 50 cmbs; a thin biface drill from 50 to 60 cmbs; and a chert knife from 60 to 70 cmbs (Table 6.91).

Below F 1, artifact frequency dropped off dramatically from 80 to 110 cmbs, with several flakes and bone fragments found therein. At 110 to 130 cmbs, artifact frequency increased markedly. Numerous burned rocks and flakes and several bone fragments were recovered from this lower zone. This artifact-bearing zone was situated under a coarse-grained cap and a Castroville and a Montell dart point were found almost adjacent to each other from 110 to 120 cm, implying that a Late to Transitional Archaic component is present at the site (Turner and Hester 1985). This interpretation is supported by an AMS radiocarbon age of 2470 ± 60 BP (Beta b-75158) obtained on charcoal from Level 12. At 130 cmbs, artifact frequencies declined again, with lithics occurring sporadically in levels from 130 to 250 cmbs. Some of the lithics from these lower elevations were covered with a carbonate film, suggesting long-term burial.

Ten projectile points of Late Archaic to Late Prehistoric affiliation were recovered from the midden (Table 6.98). Three of these points were flaked from Southeast Range materials (Heiner Lake Tan), three others represent the North Fort province (Fort Hood Yellow and Owl Creek Black), and four others represent indeterminate materials. A total of 29 chipped stone artifacts were also recovered (Table 6.99). They include a multiple platform core, all stages of biface reduction, and edge-modified tools. In addition, one of the few drills recovered in this phase of the testing effort was recovered from this site. Once again, the identified lithic material represented is associated with the Southeast Range province (Heiner Lake Tan, Fossiliferous Pale Brown) and the North Fort province (Fort Hood Yellow, Gray/Brown/Green).

Figure 6.75 Profile of South Wall of TP 1, F 1 Showing Stratigraphic Zones, 41CV1007.

Thirteen identified chert types and nine indeterminate chert categories were included in the debitage assemblage recovered from AU 2 (Table 6.100). One-third of the assemblage was assigned to defined types. When the entire assemblage was considered, Fort Hood Yellow and the aggregate indeterminates occurred in greater than expected frequencies and the remainder of identified types occurred in less than expected frequencies. When the indeterminates were excluded, Heiner Lake Tan and Fort Hood Yellow occurred in greater than expected frequencies; Owl Creek Black occurred in expected frequency; and Cowhouse White, Anderson Mountain Gray, Fossiliferous Pale

Brown, Heiner Lake Translucent Brown, East Range Flecked, Fort Hood Gray, Gray/Brown/Green, Leona Park, Cowhouse Mottled, and Cowhouse Mottled/Banded occurred in less than expected frequencies (Table 6.101).

Although all four identified chert provinces are represented in the sample, the North Fort province dominates due to the high frequency of Fort Hood Yellow. North Fort is represented by five types that make up more than 79% of the identified fraction; Fort Hood Yellow flakes alone account for more than 69% of all identified types. The second most frequent source is the Southeast Range province, represented by four types that make up 15% of the total. West Fort and Cowhouse province cherts are a minor component of the assemblage, comprising 1% and 4% of the identified fraction, respectively. Light Brown, dark brown, light gray, and dark gray indeterminates all occur in fairly high frequency, suggesting that a variety of unidentified raw materials are represented.

Table 6.98 Projectile Points, AU 2, 41CV1007.

	Lithic Material							
Point Type	06-HL Tan	08-FH Yellow	17-Owl Crk Black	Indet Dk Brown	Indet Lt Brown	Indet Lt Gray	Indet Misc.	Total
Castroville	2	0	0	0	0	0	0	2
Lange	0	0	1	0	0	0	0	1
Montell	0	0	0	1	0	0	0	1
Other Dart	1	1	0	0	0	0	0	2
Palmer	0	0	1	0	0	0	0	1
Sabinal	0	0	0	0	1	0	0	1
Scallorn	0	0	0	0	0	1	1	2
Total	**3**	**1**	**2**	**1**	**1**	**1**	**1**	**10**

Table 6.99 Cores and Nonprojectile Point Lithic Tools, AU 2, 41CV1007.

	Core Type	Tool Type										
Lithic Material	multiple platform	drill	early stage biface	edge modified	end scraper	graver	late stage biface	middle stage biface	preform	uniface	utilized flake	Total
06-HL Tan	1	0	1	1	0	0	0	0	0	2	0	5
07-Foss Pale Brown	0	0	0	1	0	0	0	0	0	0	0	1
08-FH Yellow	0	0	0	0	0	1	0	0	1	0	2	4
15-Gry/Brn/Grn	0	1	0	0	0	0	0	0	0	0	0	1
Indet Dk Brown	0	0	0	0	0	0	1	0	0	0	0	1
Indet Dk Gray	0	0	0	0	0	0	0	1	0	0	0	1
Indet Lt Brown	1	0	0	3	1	0	1	0	1	1	2	10
Indet Lt Gray	0	0	1	0	1	0	0	0	1	1	0	4
Indet Misc.	0	0	0	0	0	0	0	0	0	0	1	1
Indet White	0	0	0	0	0	0	0	0	1	0	0	1
Total	**2**	**1**	**2**	**5**	**2**	**1**	**2**	**1**	**4**	**4**	**5**	**29**

Table 6.100 Debitage Recovery by Size and Material Type, AU 2, 41CV1007.

	Size (cm)							
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	Total
Identified Types								
02-C White	0	0	0	1	2	0	0	3
03-AM Gray	0	0	1	3	1	2	0	7
06-HL Tan	0	0	20	29	22	4	0	75
07-Foss Pale Brown	0	0	1	0	1	2	0	4
08-FH Yellow	43	217	114	37	24	7	0	442
09-HL Tr Brown	0	0	0	2	0	0	0	2
13-ER Flecked	3	0	5	8	0	1	0	17
14-FH Gray	0	0	0	7	11	3	0	21
15-Gry/Brn/Grn	0	0	0	4	0	0	0	4
16-Leona Park	0	0	1	0	0	0	0	1
17-Owl Crk Black	0	10	7	16	5	0	1	39
18-C Mottled	0	0	0	6	4	2	12	24
23-C Mott/Banded	0	0	0	0	0	1	0	1
Subtotal	*46*	*227*	*149*	*113*	*70*	*22*	*13*	*640*
Unidentified Types								
Indet Black	4	8	13	4	0	0	0	29
Indet Dk Brown	64	208	80	9	1	0	0	362
Indet Dk Gray	20	104	38	14	7	2	0	185
Indet Lt Brown	16	207	86	68	8	2	0	387
Indet Lt Gray	10	109	23	13	3	3	0	161
Indet Misc.	8	67	35	20	13	1	0	144
Indet Mottled	0	0	0	5	7	3	0	15
Indet Trans	0	5	0	2	1	0	0	8
Indet White	0	0	7	7	2	0	0	16
Subtotal	*122*	*708*	*282*	*142*	*42*	*11*	*0*	*1307*
Total	**168**	**935**	**431**	**255**	**112**	**33**	**13**	**1947**

The assemblage is dominated by relatively small flakes, with 57% smaller than 0.9 cm and 92% smaller than 1.8 cm (Table 6.100). This distribution, coupled with the fact that 95% of the flakes are decortified (Table 6.102), suggests that latter-stage lithic reduction and tool rejuvenation were dominant.

Faunal remains recovered from AU 2 (Table 6.103) were dominated by relatively large mammals including deer, indeterminate artiodactyl, and indeterminate medium to very large mammals. Also present, albeit in smaller frequencies, are turtle and cottontail rabbit. A number of mussel shells, representing at least 13 individuals and two distinct species, were also recovered from the midden. It is unlikely that any of these shellfish were procured in the local streams, suggesting that they probably represent relatively long-distance procurement from Cowhouse Creek, Owl Creek, or the Leon River.

Table 6.101 Binomial Statistic Results, AU 2, 41CV1007.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	3	116	169	less	36	63	less
03-AM Gray	7	116	169	less	36	63	less
06-HL Tan	75	116	169	less	36	63	more
07-Foss Pale Brown	4	116	169	less	36	63	less
08-FH Yellow	442	116	169	more	36	63	more
09-HL Tr Brown	2	116	169	less	36	63	less
13-ER Flecked	17	116	169	less	36	63	less
14-FH Gray	21	116	169	less	36	63	less
15-Gry/Brn/Grn	4	116	169	less	36	63	less
16-Leona Park	1	116	169	less	36	63	less
17-Owl Crk Black	39	116	169	less	36	63	expected
18-C Mottled	24	116	169	less	36	63	less
23-C Mott/Banded	1	116	169	less	36	63	less
Total Indet	1307	116	169	more	na	na	na

According to L. Zimmermann (personal communication, 1994), the mussel shell analyst, the modified shell is a whelk (*Busycon* sp.) pendant, and therefore represents contact with the coastal region. Of note is the presence of orange resinous stains of unknown composition on this specimen. A similar material was always present on marine shell pendants from the Anderson Collection, Morhiss, and the Ernest Witte site (41AU36) (John Dockall, personal communication to Zimmermann, 1994), which suggests that the pendant is related to similar specimens in other areas of the state. Although the function and nature of the orange stain is unknown, it may represent a pigment applied for cosmetic purposes.

6.10.3 Conclusions and Recommendations

The stratigraphic complexity revealed by these trenches indicate a dynamic geologic history for this locality. The texture of the deposits suggests that significant variations in flow conditions occurred throughout the Holocene, and that at times, the discharge regime of this small stream may have significantly disturbed or biased the archeological deposits in this location. The appearance of the deposits at this site differ significantly from those described on larger streams by Nordt (1992), but some very tentative correlations may be suggested. Unit 1 and its paleosol probably represent the Georgetown alluvium and the Royalty paleosol. Unit 2 and Unit 3 are interpreted as the Fort Hood and West Range fills, respectively, and the dark-colored fill containing most of the cultural material observed at the site probably correlates with Nordt's (1992) Ford alluvium. The validity of these correlations, and the age of the deposits in upland catchments of this type, are presently unknown and highly speculative and should be regarded in that fashion. However, given Mariah's excavation experience at Fort Hood, the clear and well-preserved stratigraphic record at this locality is relatively unique and may offer significant research potential in terms of addressing landscape change throughout the Holocene in small upland basins on Fort Hood. On these grounds, this site contains information that is central to environmental, topographic, and climatic issues outlined in the research design for Fort Hood (Ellis 1994b). Moreover, although there is extensive disturbance in F 1 and cultural materials in TP 3 are likely to

reflect redeposition by natural processes, the site also contains stratified assemblages that include intact features and other artifacts. The cultural materials are highly appropriate for addressing technological and other issues outlined in Ellis (1993a).

On this basis, site 41CV1007 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the known eligible components are relatively deeply buried, they are fairly well protected from training and other activities that affect only the surface of the site. However, adverse impacts from uncontrolled excavations (as evidenced by vandal's equipment and excavations) and erosion pose substantial threats to this scientifically valuable site. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, and (2) prevent mechanical or manual excavations by military personnel.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 130 m^2 in area. Known stratified deposits occur near F 1 to a depth of approximately 2.5 m, and a 50 m^2 block (125 m^2) excavation would recover data from a series of well-stratified occupations as well as from a burned rock feature. The peak frequencies of cultural materials in TP 2, and the upper meter of TP 3 and TP 4, apparently demonstrate the presence of stratified deposits in lower-velocity, downstream areas of the site. Because trench exposures were small and in an extremely complex depositional environment, it is not certain that peak artifact recovery from downstream units corresponds with discrete occupations or with geomorphic redeposition of cultural materials. Thus, mitigation should be accompanied by a trenching program to sound for intact deposits while simultaneously providing extensive geoarcheological profiles that can be used to assess

Table 6.102 Debitage Cortex Characteristics by Material Type, AU 2, 41CV1007.

	Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types						
02-C White	0	0	0	3	0	3
03-AM Gray	1	1	0	5	0	7
06-HL Tan	1	1	0	73	0	75
07-Foss Pale Brown	2	0	0	2	0	4
08-FH Yellow	2	5	4	431	0	442
09-HL Tr Brown	1	0	0	1	0	2
13-ER Flecked	1	1	0	15	0	17
14-FH Gray	1	0	0	20	0	21
15-Gry/Brn/Grn	0	1	0	3	0	4
16-Leona Park	0	0	0	1	0	1
17-Owl Crk Black	2	0	1	36	0	39
18-C Mottled	14	2	0	8	0	24
23-C Mott/Banded	0	0	0	1	0	1
Subtotal	*25*	*11*	*5*	*599*	*0*	*640*
Unidentified Types						
Indet Black	0	0	0	29	0	29
Indet Dk Brown	1	0	0	361	0	362
Indet Dk Gray	2	0	1	182	0	185
Indet Lt Brown	3	3	1	379	1	387
Indet Lt Gray	0	2	2	157	0	161
Indet Misc.	0	9	0	117	18	144
Indet Mottled	3	1	1	8	2	15
Indet Trans	1	0	0	7	0	8
Indet White	1	1	0	12	2	16
Subtotal	*11*	*16*	*5*	*1252*	*23*	*1307*
Total	**36**	**27**	**10**	**1851**	**23**	**1947**

Table 6.103 Faunal Recovery, AU 2, 41CV1007.

	Element									
Vertebrates	Indeterminate	Long bone	Pelvis	Permanent tooth	Plastron	Ulna	Vertebra	left	right	Total
Artiodactyla	0	0	0	0	0	1	0	0	0	1
Mammalia	7	0	0	0	0	0	0	0	0	7
Mammalia (lg/vlg)	1	0	0	0	0	0	0	0	0	1
Mammalia (med/lg)	244	2	0	0	0	0	1	0	0	247
Odocoileus sp.	0	0	0	2	0	0	0	0	0	2
Sylvilagus sp.	0	0	1	0	0	0	0	0	0	1
Testudinata	0	0	0	0	1	0	0	0	0	1
Vertebrata	16	0	0	0	0	0	0	0	0	16
Total	**268**	**2**	**1**	**2**	**1**	**1**	**1**	**0**	**0**	**276**
Bivalves										
Amblema plicata	0	0	0	0	0	0	0	0	1	1
Ambleminae	0	0	0	0	0	0	0	10	0	10
Lampsilinae	0	0	0	0	0	0	0	3	2	5
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**13**	**3**	**16**

depositional context and provide data for geochronological, paleoenvironmental, and landscape reconstruction. Extensive profile exposures should be allocated toward identifying occupations in the probable Georgetown and Fort Hood alluvial units because of their potential to contain very old occupations from very poorly documented periods. Because it is highly likely that alluvial fan and other deposits contain intact occupations that would be archeologically informative, it should be anticipated that at least another 80 m^2 of manual excavations (equivalent to a 1 m thick 80 m^2 block) will be necessary, for a total of approximately 200 m^2 of manual excavations. Carefully monitored mechanical excavations should be used as much as possible to reduce manual excavation of unproductive stratigraphy.

6.11 SITE 41CV1008

6.11.1 Introduction

In November 1993, and again in July 1995, Mariah investigated site 41CV1008. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.11.1.1 Location and Description

Site 41CV1008 is located in the Shell Mountain area of Fort Hood, at the head of an unnamed, intermittent drainage. The site measures 225 x 125 m and consists of a lithic scatter on limestone caprock, with a heavily looted rockshelter below a 25 to 30 foot high bluff (Figure 6.76). The

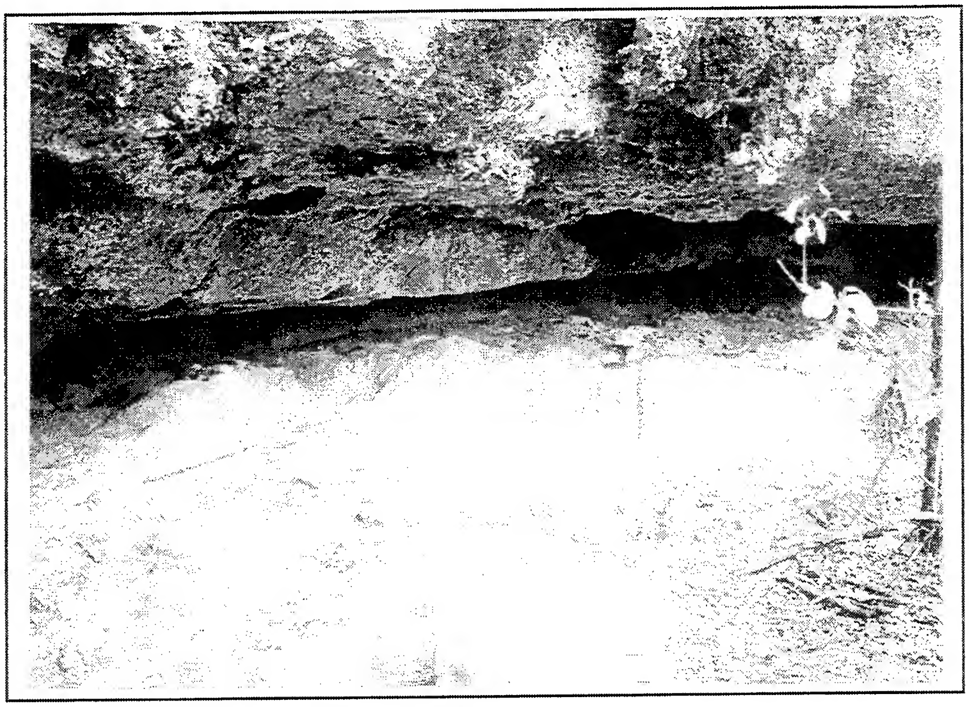

Figure 6.76 Interior of Rockshelter at Site 41CV1008.

caprock area is partially covered with juniper and oak, but is mostly covered with short grasses and has been impacted by two vehicle paths. The entrance to the shelter is covered by a moderate amount of oak and juniper with some greenbriar and poison ivy present. The shelter contains two portions, described as the northern and southern half, which are separated by a narrow limestone wall (Figure 6.77). Portions of the shelter fill, primarily in front of the dripline area, contain recent alluvium, as the slope allows for intermittent drainage during runoff. The northern half of the shelter measures 25 m long x 6 m deep, with a 1.5 to 2.5 m ceiling. Several rooffall slabs cover the floor and could possibly cover older deposits; however, the slabs are so large that they could probably not be moved, even with the use of heavy equipment. This half of the shelter has been thoroughly looted; five or six holes are visible on the surface, and approximately 5% of the potential area for testing has not been vandalized. The southern portion of the shelter measures 20 m long x 6 to 7 m deep with a 2 to 3 m ceiling along the dripline and a 1 to 1.5 m ceiling along the rear wall. This half of the shelter contains 20 to 30 vandal excavations, some quite old, but three to four were fairly recent. Only about 2% of the surface in the southern portion of the shelter appears to be still intact.

6.11.1.2 Previous Work

The site was first recorded by Rotunno in 1986 as an upland lithic workshop and tool production site with an associated rock shelter. The lithics observed on the upland surface included 15 side scrapers and a dart point. The shelter was described as heavily vandalized with evidence of possible screening of sediments.

The site was revisited by Quigg and Frederick on 5 February 1992, and Doering and Mires on 18 February 1992, at which time archeological and geomorphological assessments defined Subarea A as the rockshelter and Subarea B as the upland. No subsurface potential was recognized for

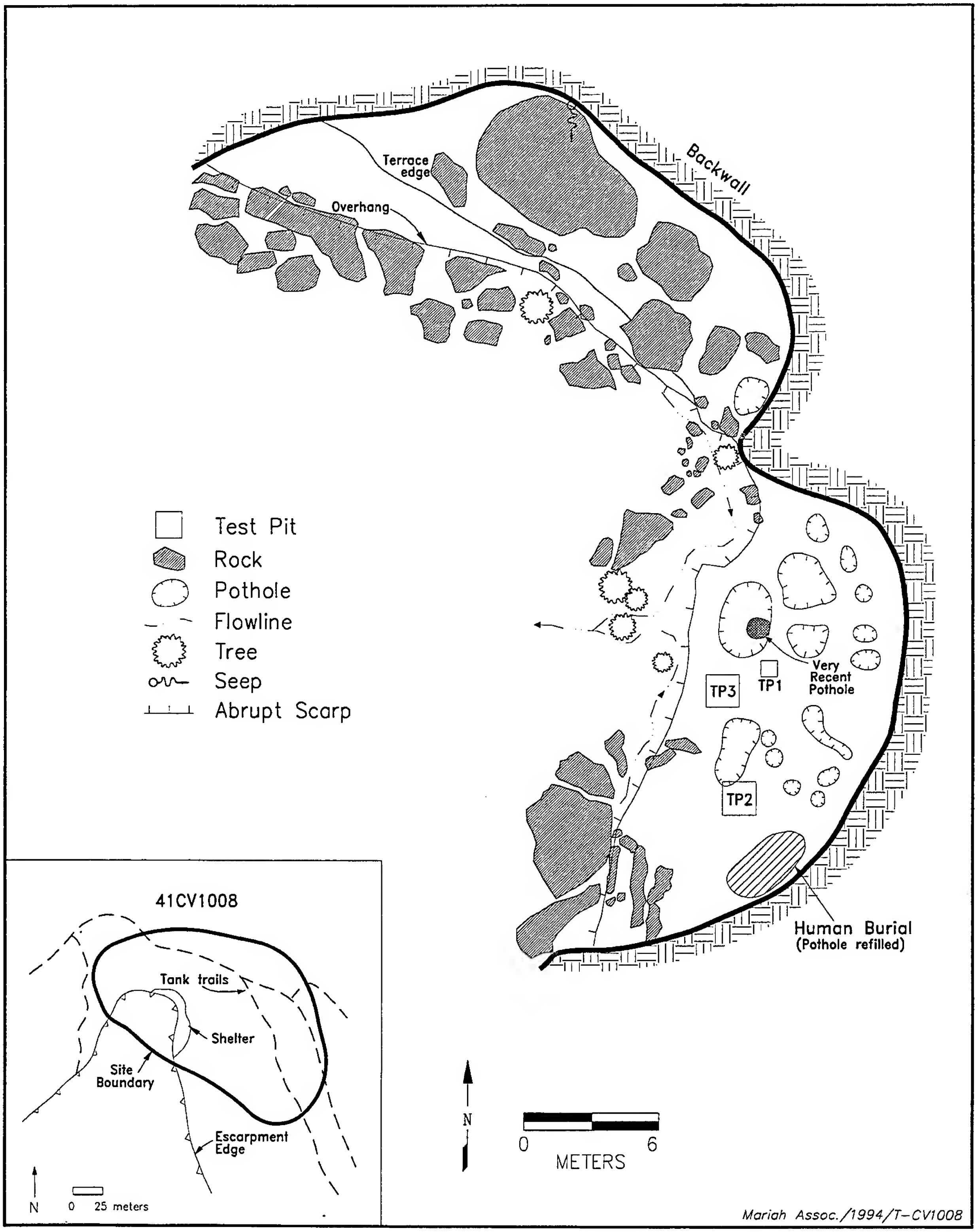

Figure 6.77 Site Map of 41CV1008.

Subarea B, but despite severe vandalism, some subsurface potential was indicated for the rock shelter. A shovel testing crew returned to the site on 14 April 1992 and excavated three shovel tests (STs 1 through 3) in the northern half of the rock shelter and a 50 x 50 cm unit (TP 1) in the south half. The shovel tests were excavated 20 to 40 cmbs.

With the exception of a cartridge casing (type unspecified) from 10 to 20 cmbs, no cultural material was recovered from the northern half of the shelter. Test pit 1, in the southern half of the shelter, was excavated to 70 cmbs and yielded 27 flakes and 2 bone fragments from the upper 10 cm, 2 flakes from 10 to 20 cmbs, and 1 flake from 20 to 30 cmbs. However, it was difficult to determine to what extent, if any, that the sediments excavated in TP 1 were intact. In the test pit, a white, chalky, decaying limestone zone was encountered at 70 cmbs and excavation was halted. On the basis of this work, the eligibility of the site was uncertain, and the site was recommended for avoidance or for formal testing if avoidance was not possible. Recommendations for the testing effort included a 1 x 2 m unit in the rear portion of the southern half of the shelter, with the unit to be excavated to bedrock to test for deep, intact, cultural remains below the vandalized areas. No further management was recommended for the upland subarea (Trierweiler 1994:A1151-1153).

6.11.1.3 New Work

Up to 2.0 m^2 of manually excavated test pits were scheduled for excavation. However, upon arriving at the shelter on 12 November 1993, a newly exposed vandal excavation was observed in the center of the southern half of the shelter. The hole was so fresh that the sneaker footprints extending from the hole beyond the dripline had not yet been erased by wind or water. The backdirt pile from the hole was rectilinear, suggesting that a screen had been used to sift backdirt. Evidence of screening at this shelter had also been observed in 1986 by the original survey crew. Two more fairly recent looter's pits were located along the rear wall of the southern half of the shelter, one of which contained a looted human burial. After notification of the Fort Hood DEH and upon their instructions, the human remains were photographed and reinterred in the pit, which was then backfilled. No artifacts or skeletal material were collected. Five days later (17 November) a short videotape segment was made of the disturbance. No further work was conducted at that time.

After documenting the site in a preliminary report and at the suggestion of the Texas Department of Antiquities Protection, additional work was undertaken at the site on July 27 and 28, 1995. Two 1 x 1 m units (TP 2 and TP 3) were hand excavated into the shelter deposits within the southern half of the rockshelter (Table 6.104). Test pit 2 was excavated at the southern end of a previous pot hole, half-way between the front and rear of the shelter (Figure 6.77). Test Pit 3 was subsequently excavated in front of earlier TP 1 and between two large looters holes. At both units, the ground surface was uneven and portions contained various amounts of backdirt from the adjacent vandalism. This backdirt was removed and screened, and was designated "level 0" so as to begin level 1 with what appeared to be the original ground surface. The northwestern corner of each unit was designated as datum and depth measurements taken from that corner. Both units were excavated to apparent bedrock, a white limestone of varying degrees of hardness, which covered the entire floor of each unit when encountered.

Table 6.104 List of Treatment Units, 41CV1008.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cm)
1	TP 2	1.0	1.0	20
1	TP 3	1.0	1.0	20

6.11.2 Results

6.11.2.1 Burial

The vandal pit which contained the burial was approximately 70 cm wide and 150 to 170 cm long, parallel with the back wall of the shelter. The walls of the pit were very loose and have partially collapsed, but a depth of 40 cmbs was established for an average depth. The human remains had apparently been excavated and placed back into the hole without backfilling, with the long bones neatly stacked. It is likely that the vandalism occurred between February 1992, when Mariah's survey crew visited the site and November 1993, when the testing crew returned.

The skeletal assemblage contained the following elements: both femurs; both tibias; one fibula; cervical, thoracic, and lumbar vertebrae; orbital and nasal cranial parts; ribs; carpals; tarsals; and pelvis (ischium and acetabulum). No teeth were observed in the pit. The skeletal remains appeared to be that of a male (judging from small angle for sciatic notch) and Native American (45° angle for the femur head). The elements were robust and very well preserved. The femur length was 47 to 47.5 cm from the end of the condyles to the femur head. The vertebra exhibited limited arthritic lipping, mainly on the lower thoracic and lumbar vertebra, but no actual fusion had occurred.

The length of the pit and the fact that bones from head to toe were recovered from the hole, suggest an extended burial rather than a bundle or flexed burial. Only a crude biface, a possible knife which may have been associated with the skeletal remains, was found on the backdirt pile next to the burial. It is probable that the entire burial has been disturbed, but a small 1.5 to 2 m^2 area, just to the south of the burial, is relatively flat and possibly still intact.

6.11.2.2 Test Pits

The excavated matrix from both excavated test pits was a very fine silt with numerous limestone fragments. These varied in size from 1 to 17 cm, with the smaller pieces being more numerous. The matrix was a gray color and contrasted to the white matrix of limestone bedrock. A number of the vandals holes had penetrated the bedrock bringing up white powdery limestone matrix and solid rocks. Two vandal pits north of TP 2 and TP 3 were inspected and sketched in profile. One pit was located towards the front of the shelter and one towards the back. Both showed the gray, 15 to 24 cm thick cultural bearing matrix lying on top of the soft, whiter limestone bedrock.

The cultural material recovered from TPs 2 and 3 is summarized by unit, level, and material type in Table 6.105. As this table illustrates, the mixed

Table 6.105 Artifact Recovery by Test Pit, 41CV1008.

	TEST PIT 2					TEST PIT 3				
LEVEL	Bivalve	Bone	Lithic	Lithic Tool	Burned rock (kg)	Bivalve	Bone	Lithic	Lithic Tool	Burned rock (kg)
0	0	9	59	0	0(0)	0	19	69	3	0(0)
1	0	26	123	6	0(0)	0	133	333	4	4(.25)
2	2	14	50	4	0(0)	0	76	232	5	3(.25)
TOTAL	2	49	232	10	0(0)	0	228	634	12	7(.5)

backdirt (level 0) contained lithic debris, some small animal bones, and a few tools Present but not collected were some recent historic artifacts such as aluminum foil, clear plastic tape, wood shavings, and a tiny cloth fragment. The two lower levels (levels 1 and 2) in both units showed generally higher frequencies of prehistoric tools, lithic debitage and faunal remains, with no apparent vertical concentrations.

Within the tool assemblage, eight projectile points including three identifiable types are represented (Table 6.106). As expected by superpositioning, the Bonham points were higher in the profile than the earlier Scallorn points. Their relative vertical position to one another suggests general stratigraphic context, but no visual indications of breaks in the vertical distribution of the debitage were detected in these units. Some of the recent material were recovered from level 1, but none came from level 2. Again, this vertical distribution supports the notion of intact matrix. Table 6.106 also reveals the three Bonham points were manufactured of indeterminate miscellaneous material and may indicate the material was not local. On the other hand, the two of three Scallorn points were manufactured from two known local sources. The Cameron and other dart were manufactured on a dark gray chert which may be of local origin, but it could not be specifically identified.

Besides the eight points, fourteen other tools in seven different classes were recognized (Table 6.107) and these represent nine different material categories. More than a third (36%) of the material types could not be identified to specific Fort Hood chert types and too few items are present to make meaningful statements regarding the material type frequencies by tool categories. The five incomplete bifaces and two preforms indicate tool manufacturing processes while the one edge modified and four utilized flakes imply various cutting activities occurred. The adze and wedge are specialized tools with uncertain functions. The restricted tool assemblage dominated by unfinished bifaces, projectile points, and few expedient tools, reflects hunting and tool manufacturing activities. This assemblage may represent a specific task oriented group.

Table 6.106 Projectile Points, 41CV1008.

	Lithic Material					
Point Type	06-HL Tan	17-Owl Crk Black	Indet Dk Gray	Indet Lt Brown	Indet Misc	Total
Bonham	0	0	0	0	3	3
Cameron	0	0	1	0	0	1
Other Dart	0	0	1	0	0	1
Scallorn	1	1	0	1	0	3
Total	**1**	**1**	**2**	**1**	**3**	**8**

Table 6.107 Lithic Tools, 41CV1008.

	Tool Type							
Lithic Material	adze	edge modifed	late stage biface	middle stage biface	preform	utilized flake	wedge	Total
03-AM Gray	0	0	1	1	0	0	0	2
06-HL Tan	0	0	0	2	1	1	0	4
08-FH Yellow	1	0	0	0	0	0	0	1
14-FH Gray	0	0	0	0	0	1	0	1
17-Owl Crk Black	0	0	0	0	0	1	0	1
Indet Dk Brown	0	0	0	1	0	0	0	1
Indet Dk Gray	0	0	0	0	1	0	0	1
Indet Lt Brown	0	0	0	0	0	1	1	2
Indet Mottled	0	1	0	0	0	0	0	1
Total	**1**	**1**	**1**	**4**	**2**	**4**	**1**	**14**

Thirteen identified and eight indeterminate chert categories were recognized in the debitage recovered (Table 6.108). Only about 22% of the material was identifiable into specific categories. The majority (68%) of the identifiable pieces were from the North Fort Hood Chert Province, followed by 26% from the Southeast Range Chert Province, while Cowhouse (2%) and West Range (4%) Chert Provinces were minimally represented. Owl Creek Black dominated (35%) the identified material, which is surprising, since this material is from the eastern end of the North Fort Hood Chert Province. Of the unidentifiable types, two categories, alight brown (41%) and indeterminate miscellaneous (24%) make up the majority. It is possible that many of these are local Fort Hood chert types that at this time we do not recognize. The combined indeterminates occur in higher than expected frequency, Owl Creek Black occurs in expected amounts, while all other types occur in less than expected frequency. The exclusion of the indeterminates results in all types occurring in higher than expected frequencies (Table 6.109).

Most of the lithic debris is quite small in size. The majority (48%) of debitage is between 0.5-0.9 cm while the second most frequent size is 0.9-1.2 cm (Table 6.108). These sizes coupled with the limited range of sizes, imply latter stage bifacial reduction and tool finishing occurred. This supports the recovered tool inventory while further support of this interpretation comes from the lack of cortex on the majority (92%) of pieces (Table 6.110). Not surprisingly, the six identifiable chert types that exhibit cortex were dominated (80%) by the North Fort Hood Chert Provence.

Table 6.108 Debitage Recovery by Size and Material Type, 41CV1008.

	Size (cm)						
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types							
02- White	1	4	4	0	0	0	9
03-AM Gray	0	0	1	5	1	0	7
06-HL Tan	0	8	7	10	2	2	29
07-Foss Pale Brown	0	0	0	1	0	0	1
08-FH Yellow	0	3	5	2	1	0	11
09-HL Tr Brown	0	0	1	0	0	0	1
10-HL Blue	0	0	0	0	1	0	1
11-ER Flat	0	13	12	2	2	0	29
13-ER Flecked	0	6	0	0	2	0	8
14-FH Gray	0	2	0	8	1	0	11
15-Gry/Brn/Grn	0	0	6	2	1	2	11
17-Owl Crk Black	10	33	20	2	1	0	66
18-C Mottled	0	0	0	1	3	0	4
Subtotal	*11*	*69*	*56*	*33*	*15*	*4*	*188*
Unidentified Types							
Indet Black	0	20	3	0	1	0	24
Indet Dk Brown	0	20	29	7	4	1	61
Indet Dk Gray	35	23	17	7	1	0	83
Indet Lt Brown	34	159	60	13	6	3	275
Indet Lt Gray	0	4	2	2	1	2	11
Indet Misc.	16	102	26	19	0	0	163
Indet Mottled	0	0	11	1	1	1	14
Indet White	18	18	8	2	1	0	47
Subtotal	*103*	*346*	*156*	*51*	*15*	*7*	*678*
Total	**114**	**415**	**212**	**84**	**30**	**11**	**866**

The recovered faunal assemblage of 277 pieces represents diverse species and includes small and large mammals, serpents, turtles, and two sizes of birds, (Table 6.111). Mammals clearly dominate (94%) the assemblage, however it is difficult to state with certainty which species were culturally derived. The mammals are dominated (40%) by small (e.g. rat-sized) elements with at least six individuals represented. Shrew, rabbit, and deer sized mammals are also represented. No bison size elements were identified. Combining the small with the small to medium sized animals accounts for 69% of the assemblage. Deer size elements (large to very large) account for only 12% of the total, but some of these pieces were burned, thus suggesting they were culturally derived. No cut marks or cultural modifications were recognized. The faunal material was most frequent in level 1 and may reflect potential mixing of recent additions into earlier cultural levels.

Table 6.109 Binomial Statistic Results, 41CV1008.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02- White	9	47	76	less	7	22	more
03-AM Gray	7	47	76	less	7	22	more
06-HL Tan	29	47	76	less	7	22	more
07-Foss Pale Brown	1	47	76	less	7	22	more
08-FH Yellow	11	47	76	less	7	22	more
09-HL Tr Brown	1	47	76	less	7	22	more
10-HL Blue	1	47	76	less	7	22	more
11-ER Flat	29	47	76	less	7	22	more
13-ER Flecked	8	47	76	less	7	22	more
14-FH Gray	11	47	76	less	7	22	more
15-Gry/Brn/Grn	11	47	76	less	7	22	more
17-Owl Crk Black	66	47	76	expected	7	22	more
18-C Mottled	4	47	76	less	7	22	more
Total Indet	678	47	76	more	na	na	na

Besides the recognized cultural material (Table 6.105), *Rabdotus* sp. land snails were plentiful in these levels with samples of 20 or more collected from each level, except level 0. Scattered chunks of charcoal were observed in these units, but pieces were not collected do to their fresh appearance and probable association with recent use of this shelter.

6.11.3 Conclusions and Recommendations

Human skeletal remains are known to be present in the shelter. While the known skeletal remains have been completely disturbed, a combination of direct dating and isotope analyses could be conducted to provide a data set for further paleodiet and paleopathology research.

Based on the projectile points, at least two occupation events are represented in the shallow deposits, dating to the Scallorn and Bonham phases of the Late Prehistoric. Cultural events are primarily represented by quantities of chipped stone tool debris and a few stone tools with no evidence of intact features or definable activity areas. Biface reduction and tool refurbishing were apparently activities here. No features were discovered and burned rock is lacking. The faunal material is dominated by small rodents, possibly non-cultural.

The context from which the human bone and the artifactual material was recovered is extremely poor. The shallow nature of the deposits, the lack of stratigraphic definition, and especially the widespread and severe vandalism all hinder our ability to separate the cultural material into temporally meaningful assemblages. As a result, this site offers little overall potential to contribute to the Fort Hood research questions (Ellis et al. 1994). On the basis of the above, we judge 41CV1008 to be not significant and ineligible for inclusion in the NRHP. No further management is recommended for this site.

However, because human remains are known to be present, and out of respect for the concerns of Native Americans, it would be appropriate to avoid and protect the site, if possible, to prevent any further disturbance of the human remains.

Table 6.110 Debitage Cortex Characteristics by Material Type, 41CV1008.

	Partial Cortex				
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Total
Identified Types					
02- White	0	0	0	9	9
03-AM Gray	0	0	0	7	7
06-HL Tan	0	0	2	27	29
07-Foss Pale Brown	0	0	0	1	1
08-FH Yellow	0	0	1	10	11
09-HL Tr Brown	0	0	0	1	1
10-HL Blue	0	0	0	1	1
11-ER Flat	0	0	0	29	29
13-ER Flecked	0	0	0	8	8
14-FH Gray	0	0	2	9	11
15-Gry/Brn/Grn	1	1	3	6	11
17-Owl Crk Black	0	0	0	66	66
18-C Mottled	0	0	0	4	4
Subtotal	*1*	*1*	*8*	*178*	*188*
Unidentified Types					
Indet Black	0	0	3	21	24
Indet Dk Brown	1	0	2	58	61
Indet Dk Gray	0	0	3	80	83
Indet Lt Brown	0	5	26	244	275
Indet Lt Gray	0	1	3	7	11
Indet Misc.	5	0	4	154	163
Indet Mottled	0	2	6	6	14
Indet White	0	0	0	47	47
Subtotal	*6*	*8*	*47*	*617*	*678*
Total	**7**	**9**	**55**	**795**	**866**

6.12 SITE 41CV1011

6.12.1 Introduction

In September and October 1993, Mariah conducted test excavations at site 41CV1011. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.12.1.1 Location and Description

Site 41CV1011 is located in the northwestern part of Fort Hood. The site consists of a series of three rockshelters, just below a high escarpment edge at the head of an intermittent upland tributary of Two Year Old Creek (Figure 6.78). The site is situated approximately 300 m west of a historic water well. Maximum site dimensions are about 80 x 20 m, totaling some 1,600 m^2 (about 0.4 acre). For purposes of this report, the site is considered part of the Shell Mountain site group.

6.12.1.2 Previous Work

This site was initially recorded by Mehalchick on 29 January 1986, as three rockshelters (Shelters A-C). A Scallorn arrow point was collected and flakes, a mano, mussel shell, bone, and burned rocks were observed in Shelter A. No cultural material was observed within Shelter B. Flakes, bone, and burned rocks were observed in Shelter C. The shelters were estimated to be 40%, 90%, and 75% disturbed by vandalism, respectively. Military refuse was noted as being strewn throughout the site.

Quigg and Frederick revisited the site in January 1992 and reevaluated it on archeological and geomorphic observations. Because each of the three shelters had the potential for intact cultural deposits, two shovel tests were excavated within Shelter A, and one shovel test was excavated within each of Shelters B and C. The results of shovel testing suggested that all three shelters contained shallow cultural deposits which had likely been disturbed and mixed. However, observations of the colluvial talus deposits outside of Shelter A suggested that in situ deposits were probably present therein. Therefore, while no further management was recommended for Shelters B and C, the eligibility status of Shelter A was judged to be uncertain. A 1 x 2 m manually excavated test pit on the talus was recommended to

Table 6.111 Faunal Recovery, 41CV1008.

	Element																				
Vertebrates	Calcaneus	Cranium	Femur	Fourth Carpal	Humerus	Indeterminate	Long bone	Mandible	Maxilla	Metapodial	Pelvis	Phalange	Radius	Rib	Sacrum	Scapula	Thoracic vertebra	Tibia	Tooth	Ulna	Vertebra	Total
Aves (large)	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Aves (medium)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Leporidae	1	0	1	0	0	0	0	2	0	0	0	0	1	0	0	1	0	2	1	1	6	16
Mamalia (lg/vlg)	0	0	0	0	0	0	27	0	0	1	0	0	0	3	0	0	0	0	2	0	0	33
Mammalia (med/lg)	0	0	0	0	1	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Mammalia (medium)	0	0	0	0	0	3	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Mammalia (micro)	0	1	4	0	5	0	0	2	1	0	1	0	0	0	0	0	0	0	0	0	0	14
Mammalia (micro/sm)	0	0	1	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	4
Mammalia (sm/med)	0	0	0	0	1	29	33	0	0	0	0	0	0	0	0	0	1	0	0	0	1	65
Mammalia (small)	0	2	37	0	2	0	2	9	0	0	14	0	0	0	4	0	0	23	7	1	9	110
Serpentes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Sigmondon sp.	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Testudinata	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Vertebrata	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Total	**1**	**3**	**43**	**2**	**9**	**36**	**75**	**23**	**1**	**1**	**17**	**1**	**1**	**3**	**5**	**1**	**1**	**25**	**10**	**2**	**17**	**277**

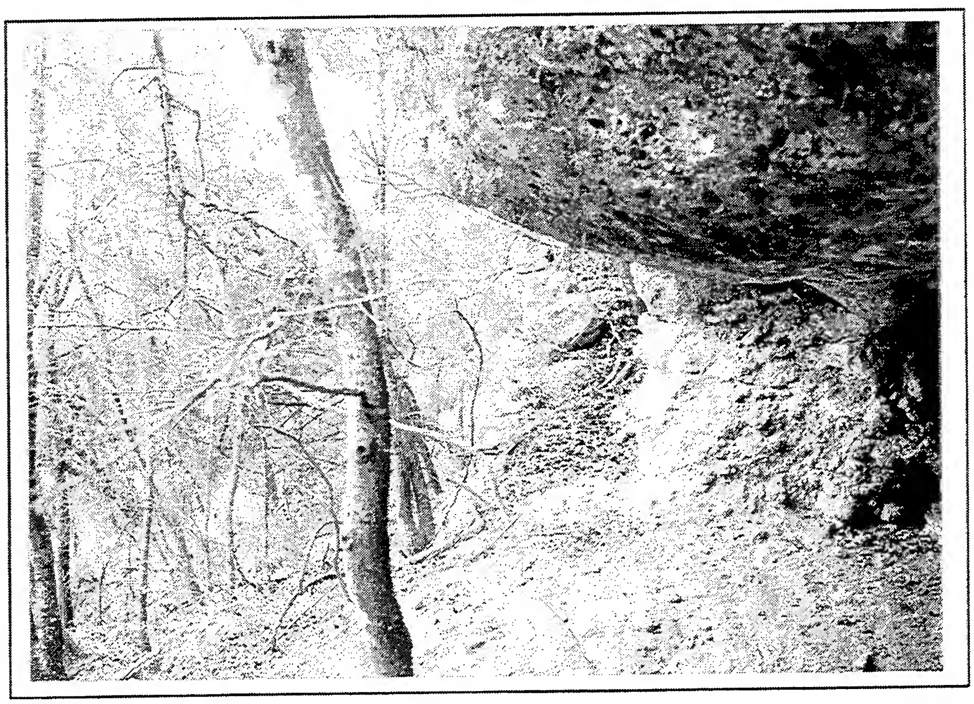

Figure 6.78 Profile of Rockshelter at Site 41CV1011.

determine NRHP eligibility (Trierweiler 1994:A1155-1159).

6.12.1.3 New Work

Three 1 x 1 m test pits (TPs 1, 2, and 3) were excavated on the talus below Shelter A (Table 6.112; Figure 6.79). Test pits 1 and 2 were placed on the steep talus slope below the entrance of the shelter and TP 3 was placed on a relatively flat bench at the base of the talus. Recovered cultural material is summarized in Table 6.113.

6.12.2 Results

Cultural material was recovered from each test pit excavated on the talus. Vandals' backdirt, evidenced by extremely loose, black loam containing well-sorted gravels and pieces of plastic, was present in the top 20 cm of both TP 1 and TP 2, and also in the top 80 cm of TP 3.

Test pit 1 (Figure 6.80) was placed 5 m below the opening of Shelter A and excavated to bedrock (70 cmbs). A very high number of flakes, numerous burned rocks and bone fragments, six points (both arrow and dart), and a couple of mussel shells were recovered from the upper disturbed levels. In addition, an AMS radiocarbon age of 1740 ± 60 BP (Beta b-74468) was obtained from charcoal contained in Level 2, indicating that the disturbed material probably dates to the Late Archaic or very early Late Prehistoric. At approximately 20 cmbs, a compact brown clay loam was encountered. A complete basal tang knife and an Edgewood dart point were recovered from immediately below this contact, suggesting that vandalism had not occurred below this depth. From 20 to 40 cmbs, high frequencies of flakes, a Scallorn point, and several bone fragments and burned rocks continued to be found. Artifact frequencies declined dramatically at 40 cmbs and decreased further from 50 cmbs to bedrock. A second AMS radiocarbon age, 2610 ± 60 BP (Beta b-74469), was obtained from below most of the cultural material (Level 6), indicating that the talus accumulation is probably wholly a late Holocene phenomenon.

Test pit 2 was placed 3 m below the opening of Shelter A and excavated to bedrock (50 cmbs). Again, numerous flakes, three dart points, several burned rocks and bone fragments, and a couple of mussel shells were recovered from the upper two disturbed levels. From 20 to 40 cmbs, several flakes and a couple of burned rocks and bone fragments were found. The bottom level was culturally sterile.

Test pit 3 (Figure 6.81) was placed on a relatively flat bench approximately 10 m below the opening of Shelter A, and was also excavated to bedrock (150 cmbs). The flat bench appeared to be composed of colluvial sediments that had been trapped on the upslope side of a huge boulder. However, during excavation, it was recognized that this flat bench had been created by vandals' backdirt; the upper 80 cm of TP 3 contained recent historic materials and appeared in profile to reflect a disturbed matrix, however, a Scallorn and Perdiz were collected. The vandal's backdirt terminated at roughly 80 cmbs. Approximately 1,100 lithics and more than 50 pieces of bone were recovered from these disturbed levels, provenienced as a single deposit. Below 80 cmbs, numerous flakes, bone fragments, and burned rocks were recovered from each level below the vandals' backdirt to 140 cmbs. In addition to these artifacts, a Scallorn point was found from 100 to 110 cmbs, and mussel shell umbos or fragments were found from 80 to 120 cmbs. No cultural material was found from 140 to 150 cmbs.

Table 6.112 List of Treatment Units, 41CV1011.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cm)
1	TP 1	1.0	1.0	70
1	TP 2	1.0	1.0	50
1	TP 3	1.0	1.0	150

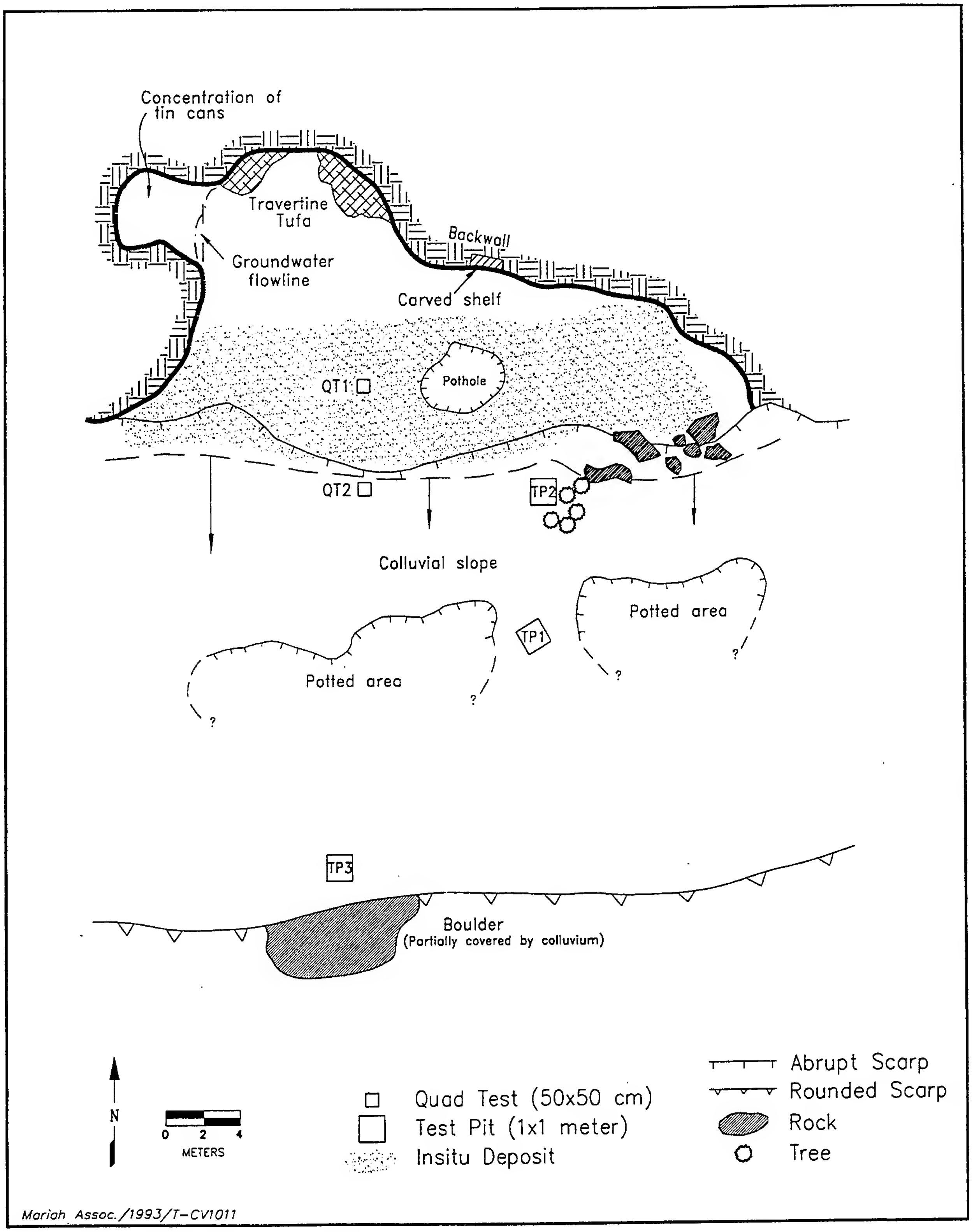

Figure 6.79 Site Map of 41CV1011.

Table 6.113 Artifact Recovery by Test Pit, 41CV1011.

	None					TEST PIT 1					TEST PIT 2					TEST PIT 3				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
surface	0	0	0	1	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
1						1	39	310	17	10(1.5)	1	0	178	5	13(3)	0	0	0	0	0(0)
2						0	44	216	9	0(0)	0	6	44	3	7(2)	0	0	0	0	0(0)
3						0	44	199	8	20(3.5)	0	1	9	0	2(0.5)	0	0	0	0	0(0)
4						0	48	49	3	0(0)	0	6	2	0	0(0)	0	0	0	0	0(0)
5						0	3	65	0	22(4)	0	0	0	0	0(0)	0	0	0	0	0(0)
6						0	0	12	0	7(1.2)						0	0	0	0	0(0)
7						0	0	5	0	10(1.5)						0	0	0	0	0(0)
8						0	0	0	0	7(0.8)						1	141	956	42	2(0.5)
9																0	7	46	3	7(1.5)
10																2	21	101	6	11(5)
11																0	37	130	8	21(7)
12																1	16	136	6	10(6)
13																0	15	79	2	2(0.9)
14																0	4	26	0	0(0)
15																0	0	0	0	0(0)
TOTAL	0	0	0	1	0(0)	1	178	856	37	76(12.5)	1	13	233	8	22(5.5)	4	241	1474	67	53(20.9)

A Scallorn arrow point was collected from the surface of this site and 15 projectile points were recovered from the excavations. Although the stratigraphy has been altered by vandalism, the types of points recovered suggest a Late Archaic through Late Prehistoric utilization of this site (Table 6.114). The majority of projectile points are made from indeterminate cherts, with Fort Hood Yellow (North Fort) and East Range Flecked (Southeast Range) the only recognizable raw materials. The non-debitage lithic assemblage consists of 101 specimens, including four multiple platform cores, and a full range of biface reduction stages, as well as unifacially modified tools (Table 6.115). Although only 42% of the tool assemblage could be associated with recognized chert types, all four chert provinces are represented in significant numbers in the tool assemblage, with the majority of identified specimens affiliated with the Southeast Range (16% of the identified total), North Fort (14%), and Cowhouse (7%) provinces.

A large, diverse assemblage of debitage consisting of 12 identified chert types, nine indeterminate chert categories, and one quartzite type was recovered from 41CV1011 (Table 6.116). Slightly more than 11% of the assemblage was identified. Due to the relatively low frequency of identification, all of the identified types occurred in less than expected frequency when the entire assemblage was considered. Exclusion of the indeterminates resulted in greater than expected frequencies for Heiner Lake Tan and Fort Hood Yellow; expected frequencies for Cowhouse White, Anderson Mountain Gray, Fossiliferous Pale Brown, Fort Hood Gray, and Owl Creek Black; and less than expected frequencies for Heiner Lake Translucent Brown, Heiner Lake Blue, East Range Flecked, Gray/Brown/Green, Cowhouse Mottled, and Cowhouse Dark Gray (Table 6.117). Two fragments of coarse-grained, reddish-purple quartzite (which refit to form a single small flake that has been snapped in half, possibly during excavation) also occurred in less than expected frequency. Indeterminates are dominated by light brown (50% of the total assemblage) and dark brown (16% of the total) flakes, many of which

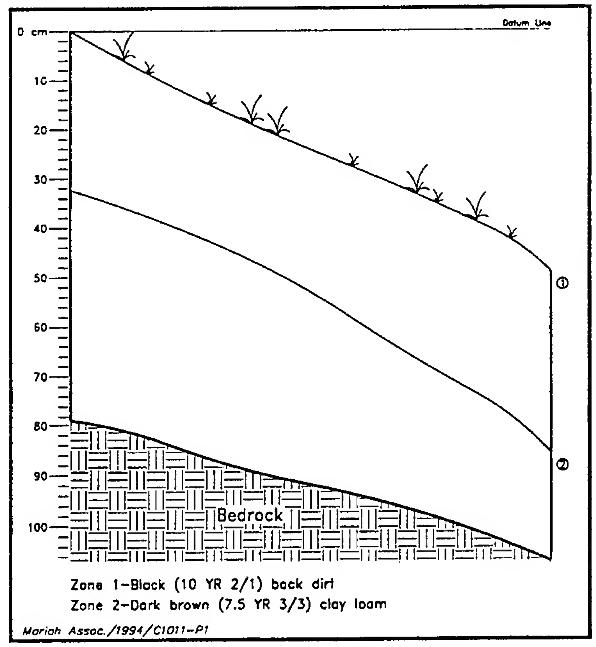

Figure 6.80 Profile of East Wall, TP 1, 41CV1011.

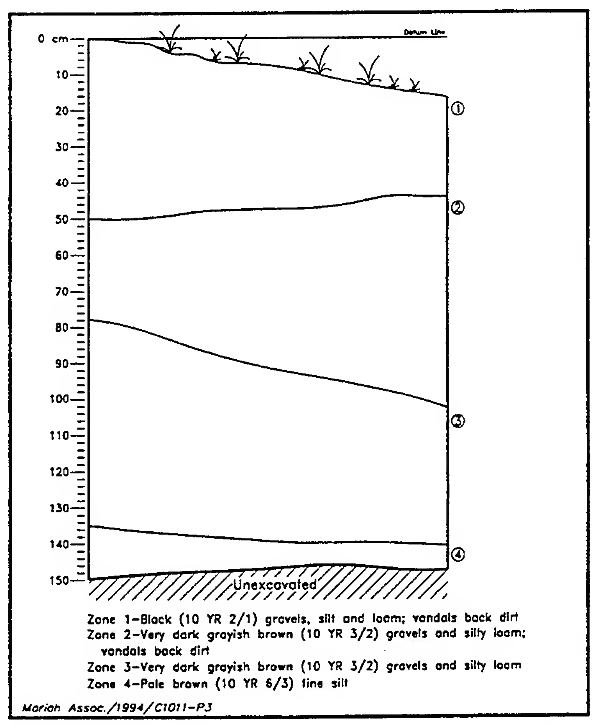

Figure 6.81 Profile of East Wall, TP 3, 41CV1011.

probably also represent the Heiner Lake Tan and Fort Hood Yellow types.

All four recognized chert provinces are represented in the assemblage. The dominant source is Southeast Range, which is represented by five types that comprise 58% of the identified assemblage. The North Fort province contributes four types that comprise 32% of the identified total, while West Fort (one type) and Cowhouse (three types) each make up 4% of the total. The purple quartzite flake, which clearly represents an exotic material, is relatively small and probably represents resharpening of an existing tool.

Table 6.114 Projectile Points, AU 1, 41CV1011.

	Lithic Material								
Point Type	08-FH Yellow	13-ER Flecked	Indet Dk Brown	Indet Dk Gray	Indet Lt Brown	Indet Lt Gray	Indet Misc	Indet Mottled	Total
Cliffton	0	0	0	0	0	1	0	0	1
Darl	0	0	0	0	0	0	1	1	2
Edgewood	0	0	0	0	1	0	0	0	1
Fairland	1	0	0	0	0	0	0	0	1
Other Dart	0	0	1	2	0	0	0	0	3
Pedernales	1	0	0	0	0	0	0	0	1
Perdiz	0	0	0	1	0	0	0	0	1
Scallorn	0	1	3	0	1	0	0	1	6
Total	**2**	**1**	**4**	**3**	**2**	**1**	**1**	**2**	**16**

Table 6.115 Cores and Nonprojectile Point Lithic Tools, AU 1, 41CV1011.

	Core Type	Tool Type											
Lithic Material	multiple platform	complex scraper	early stage biface	end scraper	graver	late stage biface	middle stage biface	preform	side scraper	uniface	utilized flake	wedge	Total
02-C White	0	0	0	0	0	0	0	0	0	2	0	0	2
03-AM Gray	0	0	0	1	0	0	0	0	0	2	0	0	3
06-HL Tan	1	0	1	0	0	1	2	0	2	5	1	0	13
07-Foss Pale Brown	0	0	0	0	0	0	0	0	0	0	1	0	1
08-FH Yellow	0	0	0	0	0	2	0	0	0	2	0	0	4
09-HL Tr Brown	0	0	0	0	0	0	0	0	0	1	0	0	1
11-ER Flat	0	0	0	0	0	0	0	0	1	2	0	0	3
14-FH Gray	1	0	0	0	0	0	1	0	0	1	0	0	3
15-Gry/Brn/Grn	0	0	0	0	0	2	0	0	0	0	0	0	2
17-Owl Crk Black	0	0	0	0	0	1	0	0	0	1	0	0	2
18-C Mottled	0	0	0	0	0	0	0	0	0	2	0	0	2
22-C Mott/Flecks	0	1	1	0	0	0	1	0	0	2	0	0	5
25-C Br Fleck	0	1	0	0	0	0	0	0	0	0	0	0	1
Indet Dk Brown	0	1	0	0	0	0	0	3	2	3	1	0	10
Indet Dk Gray	0	0	0	1	1	0	1	1	2	3	0	0	9
Indet Lt Brown	1	1	1	1	0	6	2	0	1	3	0	2	18
Indet Lt Gray	0	0	0	0	0	1	2	0	1	0	1	0	5
Indet Misc.	0	0	0	0	0	1	0	0	1	4	0	0	6
Indet Mottled	0	0	0	1	0	1	0	0	2	1	0	0	5
Indet White	1	1	0	0	0	0	0	0	1	2	0	1	6
Total	**4**	**5**	**3**	**4**	**1**	**15**	**9**	**4**	**13**	**36**	**4**	**3**	**101**

Table 6.116 Debitage Recovery by Size and Material Type, AU 1, 41CV1011.

	Size (cm)							
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	Total
Identified Types								
02-C White	0	0	3	12	1	0	0	16
03-AM Gray	1	3	0	8	0	1	0	13
06-HL Tan	0	45	6	28	31	1	0	111
07-Foss Pale Brown	0	0	0	5	6	7	1	19
08-FH Yellow	0	2	17	20	12	1	1	53
09-HL Tr Brown	0	0	5	3	0	0	0	8
10-HL Blue	0	3	0	7	1	0	0	11
13-ER Flecked	0	4	3	2	0	0	0	9
14-FH Gray	0	1	5	5	4	1	0	16
15-Gry/Brn/Grn	0	0	2	4	2	2	0	10
17-Owl Crk Black	2	0	8	0	3	0	0	13
18-C Mottled	0	0	0	0	1	0	0	1
19-C Dr Gray	0	0	0	1	1	0	0	2
Subtotal	*3*	*58*	*49*	*95*	*62*	*13*	*2*	*282*
Unidentified Types								
Indet Black	2	8	0	3	0	0	0	13
Indet Dk Brown	118	196	35	49	14	3	0	415
Indet Dk Gray	24	84	52	33	5	0	0	198
Indet Lt Brown	186	523	232	154	115	61	3	1274
Indet Lt Gray	36	58	32	45	8	1	0	180
Indet Misc.	4	63	18	28	6	4	0	123
Indet Mottled	0	1	1	2	6	0	0	10
Indet Trans	0	0	1	0	0	0	0	1
Indet White	10	28	18	5	0	0	0	61
Subtotal	*380*	*961*	*389*	*319*	*154*	*69*	*3*	*2275*
Quartzite	0	2	0	0	0	0	0	2
Total	**383**	**1021**	**438**	**414**	**216**	**82**	**5**	**2559**

The size distribution is indicative of primarily latter-stage reduction; 88% of the flakes are smaller than 1.8 cm, and 55% are smaller than 0.9 cm. However, several very large (greater than 5.2 cm) flakes were also recovered, indicating that some early-stage reduction did occur. Similarly, although 88% of the assemblage is decortified (Table 6.118), the presence of several primary decortification flakes suggests that some initial reduction was performed on site. Only 10% of the cortical material is noticeably abraded, indicating that streambed procurement was relatively unimportant.

A moderately large faunal assemblage, dominated by unidentifiable deer-sized mammal bones, was recovered from the talus in front of Shelter A (Table 6.119). Most of this material is probably deer, as evinced by the presence of identifiable Odocoileus and indeterminate Artiodactyl remains,

Table 6.117 Binomial Statistic Results, AU 1, 41CV1011.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	16	147	196	less	13	31	expected
03-AM Gray	13	147	196	less	13	31	expected
06-HL Tan	111	147	196	less	13	31	more
07-Foss Pale Brown	19	147	196	less	13	31	expected
08-FH Yellow	53	147	196	less	13	31	more
09-HL Tr Brown	8	147	196	less	13	31	less
10-HL Blue	11	147	196	less	13	31	less
13-ER Flecked	9	147	196	less	13	31	less
14-FH Gray	16	147	196	less	13	31	expected
15-Gry/Brn/Grn	10	147	196	less	13	31	less
17-Owl Crk Black	12	147	196	less	13	31	less
18-C Mottled	1	147	196	less	13	31	less
19-C Dr Gray	2	147	196	less	13	31	less
Quartzite	2	147	196	less	13	31	less
Total Indet	2274	147	196	more	na	na	na

but a limited amount of bison remains were also present. Other identified taxa represented by limited remains include cottontail rabbit, raccoon, and two species of mussel shell.

6.12.3 Conclusions and Recommendations

Testing of Rockshelter A has revealed extensive disturbance by vandalism. Nevertheless, in each of the three test units excavated on the talus, intact cultural deposits, apparently dating from the Late Archaic to the early Late Prehistoric, were encountered below the vandalized deposits, much of which probably originated in the shelter. Of the 27 levels excavated, 12 were clearly vandalized (44%), 13 were apparently intact (48%), and two were sterile but undisturbed (7%). These three units represent perhaps 10% of the 30 to 40 m^2 surface area of the shelter and talus, suggesting that up to 13 m^2 of nonvandalized and intact cultural deposits may remain.

Deposits on the talus slope outside the shelter showed the presence of a colluvial horizon of rocks and artifacts in a reddish matrix. There is no basis for judging the age of this matrix because its redness could have resulted from redeposition of older, rubified deposits. Although the talus apparently has been minimally disturbed by natural impact agents below the vandalism zone, the contextual integrity of cultural material remains ambiguous due to the steep slope of the talus. Nevertheless, pockets of undisturbed materials do have the potential to address the research issues outlined in Ellis et al. (1993).

Moreover, the site has the potential to yield information on rockshelter formation and transformation, relevant to the paleoenvironmental issues outlined in Ellis et al. (1993). In this case, artifactual, chronometric, and ecofactual data would be useful for placing temporal stratigraphic constraints on talus deposits, which in turn would be useful for diagnosing the timing of the environmental processes that led to colluviation. Additional geomorphic examinations focusing on identifying the source(s) of talus sediments would be useful for determining the extent to which deposition on the talus slope corresponds with erosion from the shelter and/or upland surface.

Table 6.118 Debitage Cortex Characteristics by Material Type, AU 1, 41CV1011.

	All Cortex			Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types									
02-C White	0	0	0	0	0	1	15	0	16
03-AM Gray	0	0	0	0	0	0	13	0	13
06-HL Tan	0	0	0	1	1	6	102	1	111
07-Foss Pale Brown	0	1	0	0	6	2	10	0	19
08-FH Yellow	0	0	0	1	6	1	45	0	53
09-HL Tr Brown	0	0	0	0	0	0	8	0	8
10-HL Blue	0	0	0	0	0	1	10	0	11
13-ER Flecked	0	0	0	0	1	0	8	0	9
14-FH Gray	0	0	0	0	1	0	15	0	16
15-Gry/Brn/Grn	0	0	0	2	2	0	6	0	10
17-Owl Crk Black	0	0	0	1	0	0	12	0	13
18-C Mottled	0	0	0	0	0	1	0	0	1
19-C Dr Gray	0	0	0	0	1	0	1	0	2
Subtotal	*0*	*1*	*0*	*5*	*18*	*12*	*245*	*1*	*282*
Unidentified Types									
Indet Black	0	0	0	1	0	0	12	0	13
Indet Dk Brown	0	0	1	0	4	2	408	0	415
Indet Dk Gray	0	0	0	1	6	0	190	1	198
Indet Lt Brown	1	2	0	8	104	53	1105	1	1274
Indet Lt Gray	0	0	0	0	18	0	162	0	180
Indet Misc.	1	0	0	11	0	32	61	18	123
Indet Mottled	0	0	0	1	1	1	7	0	10
Indet Trans	0	0	0	0	0	1	0	0	1
Indet White	0	0	0	0	0	0	61	0	61
Subtotal	*2*	*2*	*1*	*22*	*133*	*89*	*2006*	*20*	*2275*
Quartzite	0	0	0	0	0	0	2	0	2
Total	**2**	**3**	**1**	**27**	**151**	**101**	**2253**	**21**	**2559**

Deposits on the talus slope appear to be sufficiently intact to permit this kind of research. Furthermore, deposits of this type appear to be relatively rare at Fort Hood; although the slope is fairly steep, boulders and other microtopographic features appear to have trapped a relatively unique sedimentary record of erosion from nearby landscape features.

On this basis, site 41CV1011 is evaluated as eligible for inclusion in the NRHP on the basis of its capacity to provide data to address issues outlined in the research design for Fort Hood (Ellis et al. 1994). Accordingly, the site should be preserved and protected from adverse impacts. Because the relevant deposits are shallowly buried, they are poorly protected from potential impacts

Table 6.119 Faunal Recovery, AU 1, 41CV1011.

	Element															
Vertebrates	Femur	Fibula	Fused 2&3rd carpal	Fused 3&4th metata	Indeterminate	Lumbar Vertebra	Mandible	Permanent tooth	Radial carpal	Radius	Rib	Tooth	Ulna	left	right	Total
Artiodactyla	3	0	1	7	0	2	2	0	1	0	0	0	1	0	0	17
Bos/Bison	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
cf. Bison bison	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Mammalia	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Mammalia (lg/vlg)	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	6
Mammalia (med/lg)	0	0	0	0	306	0	0	0	0	0	0	0	0	0	0	306
Mammalia (micro)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Mammalia (very lg)	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Odocoileus sp.	0	0	0	0	0	0	1	5	0	0	0	8	0	0	0	14
Procyon lotor	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Sylvilagus sp.	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	3
Vertebrata	0	0	0	0	78	0	0	0	0	0	0	0	0	0	0	78
Total	**3**	**1**	**1**	**7**	**394**	**2**	**5**	**6**	**1**	**2**	**1**	**8**	**1**	**0**	**0**	**432**
Bivalves																
Amblema plicata	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Lampsilinae	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**3**

from training and other activities that would affect the surface of the site. The primary sources of damage are ongoing vandalism and unintentional impacts from training activities. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, and (2) prevent manual excavations by military personnel.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1993.

Mitigative data recovery may include up to 40 m^2 of manually excavated trenches and block units, for a total of approximately 40 m^2 of manual excavations. Excavation should focus on: (1) exposing profiles up and across the talus slope; (2) identifying the intact deposits below the disturbance; (3) controlled sampling of intact deposits for temporal diagnostics, chronometric and economic samples, lithostratigraphic and geochemical samples, and other materials that will aid in the reconstruction of landscape transformation processes; and (4) identification and

recovery of potentially intact cultural deposits elsewhere on the talus slope.

6.13 SITE 41CV1023

6.13.1 Introduction

In July and December 1993, Mariah conducted test excavations at site 41CV1023. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.13.1.1 Location and Description

Site 41CV1023 is situated on a series of sloping bedrock benches on the east side of Stampede Creek (Figure 6.82). An unnamed, 4 m deep, northwest-to-southeast trending drainage bisects the western third of the site. The site measures approximately 350 m E-W by 125 m N-S (about 43,750 m^2, 10.8 acres). The upland area of the site is partially vegetated with juniper, oak, and pecan, with short grasses covering areas that have been impacted by trails (Figure 6.83). Several burned rock features, including a burned rock midden, are located on the upland area. The drainage is vegetated with juniper and oak, and has a dense understory that includes thickets of greenbriar. For the purposes of this report, the site is considered a member of the Stampede site group.

6.13.1.2 Previous Work

The site was first recorded by Masson and Turpin during a 1985 survey, when a burned rock midden and several burned rock features were observed eroding from the margins of several deeply rutted roads. A Pedernales and possible Bulverde point were recovered. No recommendations were given for the site, but the observation was made that additional burned rock features were probably preserved in the relatively undamaged areas between the roads.

The site was revisited by Quigg and Frederick on 14 February 1992, who performed archeological and geomorphological assessments that indicated potential for buried cultural material. Six burned rock features, including a burned rock midden on the west side of the drainage, were identified. The site was divided into four Subareas, designated A through D. Subarea A contains the gently sloping uplands on the eastern portion of the site, which consist of sandy soil, possibly originating from the Paluxy Sands. Subarea B, a fairly steeply sloped area, is severely denuded and contains a series of several small limestone scarps with little tree coverage. Few artifacts and no potential for contextual integrity were thought to exist in Subarea B and no further work was recommended there. Subarea C consists of an incised drainage on the western side of the site. Subarea D consists of an ancient strath terrace on the western edge of the site and contains F 5, the burned rock midden.

A shovel testing crew returned to the site in April 1992, and excavated a total of 33 shovel tests in Subareas A, C, and D. Within Subarea A, Fs 1, 3, 4, and 6 were shovel tested. Feature 2 was not shovel tested. Eighteen shovel tests were located in Subarea A and ranged in depth from 10 to 70 cmbs. Five tests encountered bedrock ranging from 10 to 36 cmbs, seven tests encountered deep brown sandy silt and no bedrock, and six tests encountered a bright red argillic horizon ranging from 8 to 15 cmbs. Four tests in Subarea A were in features, and all yielded cultural material, mainly burned rock with some lithics. The remaining positive shovel tests in Subarea A contained mainly burned rock with some lithics and a mussel shell fragment. Seventy percent of the cultural remains from Subarea A were from the upper 20 cm. Of the 13 shovel tests located in Subarea C, only one produced cultural material (burned rock from 0 to 10 cmbs). The only shovel test in Subarea D was in F 5. This test yielded burned rock, a lithic, and charcoal staining from 10 to 50 cmbs.

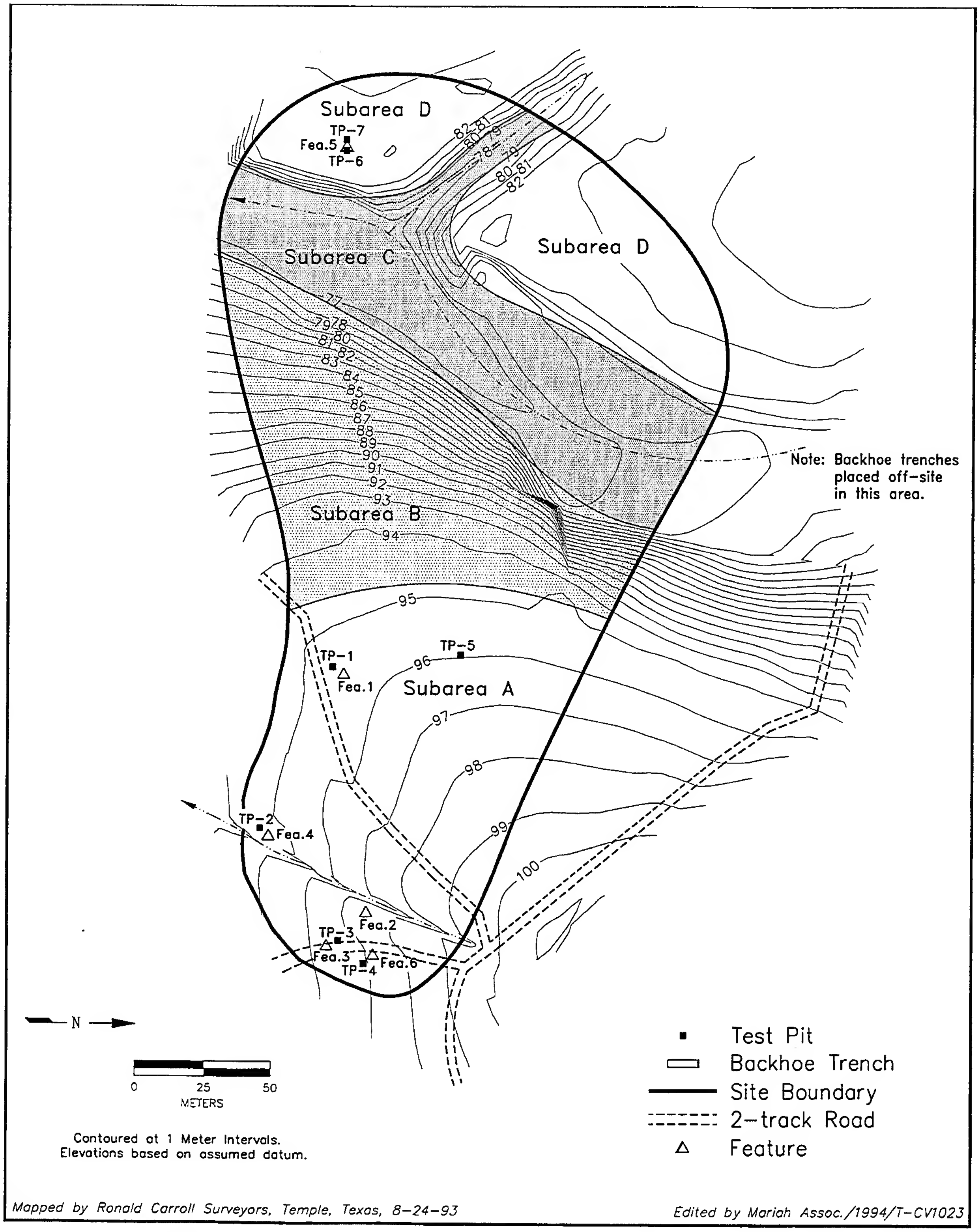

Figure 6.82 Site Map of 41CV1023.

Figure 6.83 Overview of Site 41CV1023, Looking Southwest.

Subareas B and C and the majority of Subarea D were judged to be ineligible for inclusion in the NRHP, but the eligibility status of Subarea A and F 5 in Subarea D was uncertain. No further management was recommended for Subareas B and C and the remainder of Subarea D. Subarea A and F 5 (Subarea D) were recommended for avoidance or, if avoidance was not possible, for formal testing. Recommendations for formal test excavations included six to eight 1 x 1 m of manually excavated test pits and two to four backhoetrenches (Trierweiler 1994:A1164-A1167).

6.13.1.3 New Work

Several minor modifications were made to the recommended program of testing. Although a trench had been recommended for F 5, it was not excavated because it was judged that the extent of damage to the feature would be too high in the event that it was shown to have significant data potential. Similarly, while no further work was recommended for Subarea C on the basis of reconnaissance results, two trenches (BTs 1 and 2) were excavated in Subarea C, near the northern end of the site, to confirm the absence of buried cultural material.

In addition to the trenches, the testing effort for NRHP evaluation consisted of five 1 x 1 m excavation units (TPs 1 through 5) in Subarea A and two 1 x 1 m units (TPs 6 through 7) on F 5 in Subarea D. Four of the units in Subarea A (TPs 1 through 4) were placed on Fs 1, 4, 3, and 6, respectively, while TP 5 was placed near the location of two adjacent shovel tests that yielded positive results in the reconnaissance phase. A total of 2.25 m^2 was excavated by hand (Table 6.120). Recovered cultural material is summarized in Table 6.121. Each unit was excavated in 10 cm arbitrary levels, ending when encountering bedrock or an argillic horizon that presumably predates the possibility of human occupation.

6.13.2 Results

For purposes of analysis, the tested portion of the site was subdivided into two distinct AUs: AU 1 consisted of the units excavated in Subarea A (the upland/slope); AU 2 consisted of the units excavated in the midden in Subarea D. Because no cultural material was recovered from Subarea C, no AU was defined for the trenches excavated there. The following discussion addresses each of these areas separately.

6.13.2.1 Excavations in the Upland/Slope

Feature 1 was a burned rock concentration eroding from a roadcut, measuring approximately 2 m north to south and more than 1 m east to west. On the surface, small to moderate sized tabular burned rocks were present. Test pit 1 was placed adjacent to F 1 and excavated to a depth of 14 cmbs before encountering a very compact argillic horizon. Several flakes were the only artifacts recovered from the test pit. No burned rocks were recovered from the unit, and no staining that could be attributed to the feature was observed in the upper soil horizon. The results suggest that F 1 is localized and has little depth.

Feature 4, similar to F 1, is a small, burned rock concentration eroding from a 20 cm deep road cut on the eastern portion of the site. The feature is situated in a thin soil mantle resting on limestone bedrock. Test pit 2 was placed adjacent to F 4 and excavated to an argillic horizon at 20 cmbs. Small burned rock fragments and several flakes were found from the upper 10 cm and several flakes and no burned rocks were found from 10 to 20 cmbs. No discoloration or staining that could be attributed to the feature was observed in the unit. The small amount (20 pieces; less than 1 kg) and restricted distribution of the burned rock recovered from the test pit suggests that the feature may have been a hearth, and subsequently dispersed. There is no evidence that the feature retains any subsurface integrity. Based on the roadcut exposure, bedrock is situated approximately 10 to 15 cm below the top of the argillic horizon.

Table 6.120 List of Treatment Units, 41CV1023.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	TP 1	1.0	1.0	14
1	TP 2	1.0	1.0	20
1	TP 3	1.0	1.0	50
1	TP 4	1.0	1.0	50
1	TP 5	1.0	1.0	25
2	TP 6	1.0	1.0	31
2	TP 7	1.0	1.0	34
none*	BT 1	6	0.8	200
none*	BT 2	6	0.8	200

* Subarea C

Feature 3 is a burned rock concentration, located on the eastern edge of the site, consisting of several large, burned limestone rocks and a few flakes eroding from a roadcut in a 50 to 70 cm thick sandy silty horizon. Test pit 3 was placed adjacent to F 3 and excavated to a depth of 50 cmbs (Figure 6.84). The upper 30 cm of the profile, which contains all of the cultural material, consisted of a brown to dark brown sandy silt that graded gradually into a brown sandy silt (Figure 6.85). Burned rock and *Rabdotus* sp. snails were found from 0 to 30 cmbs. No obvious structuring of the rocks was observed in the unit or roadcut, although the rocks had a fairly discrete vertical distribution at 15 to 20 cmbs in the test pit profile. A total of 120 burned rocks (10 to 11 kg), 108 of which were found 10 to 20 cmbs, were recovered from the test pit.

Feature 6 consisted of a burned rock concentration eroding from a 50 to 75 cm high road cut on the eastern portion of the site. Several small burned rocks and a couple of flakes were observed on the surface covering an area approximately 3 m north to south and an unknown distance into the roadcut. Test pit 4 was placed adjacent to F 6 and excavated to 50 cmbs. Within the test pit, 23 angular burned rocks (7 kg), ranging in size from

Table 6.121 Artifact Recovery by Test Pit, 41CV1023.

	None					TEST PIT 1					TEST PIT 2					TEST PIT 3				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
surface	0	0	0	1	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
1						0	0	14	0	0(0)	0	0	0	0	20(0.5)	0	0	0	0	2(0.9)
2						0	0	4	0	0(0)	0	0	10	0	0(0)	0	0	0	0	108(10)
3																0	0	0	0	10(0.9)
4																0	0	0	0	0(0)
5																0	0	0	0	0(0)
TOTAL	0	0	0	1	0(0)	0	0	18	0	0.0	0	0	10	0	20(0.5)	0	0	0	0	120(11.8)

	TEST PIT 4					TEST PIT 5					TEST PIT 6					TEST PIT 7				
LEVEL	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
surface	0	0	0	0	0(0)	0	0	14	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
1	0	0	0	0	37 (7.4)	0	0	140	4	0(0)	0	0	0	0	177(24.1)	0	0	1	0	632(128)
2	0	0	0	0	0(0)	0	0	31	1	1(0.8)	0	0	0	0	135(11)	0	0	0	0	357(83)
3	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	32(4.6)	0	0	0	0	72(12)
4																				
5																				
TOTAL	0	0	0	0	7(7.4)	0	0	185	5	1(0.8)	0	0	0	0	344(39.7)	0	0	1	0	1061(223)

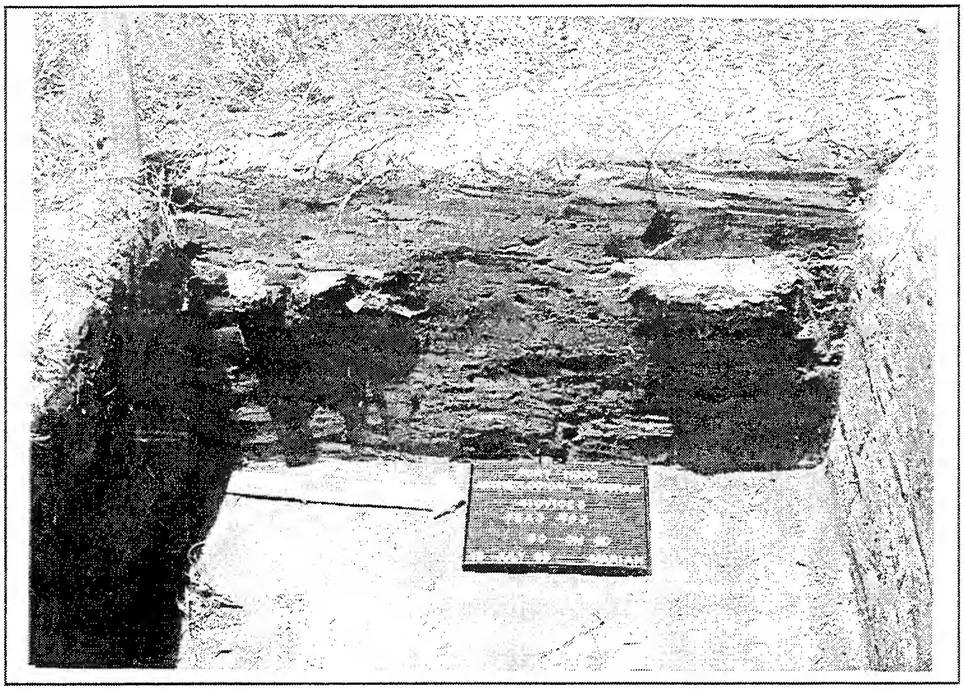

Figure 6.84 Profile of F 3, in TP 3, 41CV1023, Looking West.

6.85). Burned rock and *Rabdotus* sp. snails were found from 0 to 30 cmbs. No obvious structuring of the rocks was observed in the unit or roadcut, although the rocks had a fairly discrete vertical distribution at 15 to 20 cmbs in the test pit profile. A total of 120 burned rocks (10 to 11 kg), 108 of which were found 10 to 20 cmbs, were recovered from the test pit.

Feature 6 consisted of a burned rock concentration eroding from a 50 to 75 cm high road cut on the eastern portion of the site. Several small burned rocks and a couple of flakes were observed on the surface covering an area approximately 3 m north to south and an unknown distance into the roadcut. Test pit 4 was placed adjacent to F 6 and excavated to 50 cmbs. Within the test pit, 23 angular burned rocks (7 kg), ranging in size from 5 to 10 cm in diameter, were recovered from about 5 to 15 cmbs. No other cultural materials were recovered in the unit, and nothing in the test pit profile implied that the feature retained any subsurface integrity. No staining or discoloration that could be attributed to the feature was observed. The upper 20 cm of the profile was a brown, sandy/silty loam, A horizon containing the burned rocks. The A horizon overlies a brown sandy/silt horizon containing several snails.

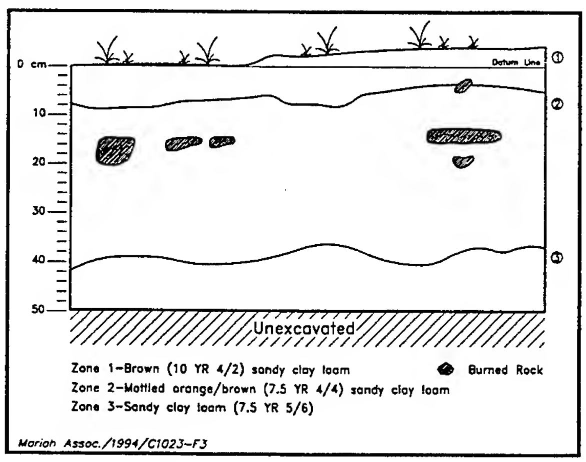

Figure 6.85 Profile of West Wall, TP 3, 41CV1023.

Only one test unit was not placed in a feature context on the site. Test pit 5 was placed in the general area of shovel tests which yielded cultural material during previous work, and was excavated to a depth of 25 cmbs. This unit, which contained the majority of recovered lithics from the site, produced over 100 flakes, one Marshall point, and two Scallorn points from the upper 10 cm, and over 30 flakes from 10 to 20 cmbs. A possible burned rock fragment was also recovered from 10 to 20 cmbs. No charcoal or staining that could be attributed to cultural activities was found during excavation or in the unit profile. Although no subsurface evidence of a feature was located, the density of artifacts strongly suggests that TP 5 was excavated through a substantial, albeit shallowly, buried cultural scatter. However, the presence of a stringer of small rocks visible about 10 to 15 cmbs in the profile suggests that sheet erosion and deposition may have reworked this material. An argillic horizon was encountered at the base of the dark brown, sandy loam, A horizon.

One untyped dart point was collected from the surface of this AU. Two Scallorn arrow points (Late Prehistoric) and one Marshall dart point (Middle Archaic) were recovered from the excavations in Test Pit 5 (Table 6.122). Although this juxtaposition of diagnostics of different ages may be the result of heirloom collection by the Late Prehistoric people, the possibility that this material is a contextless palimpsest reworked by slope wash is relatively high. The nondebitage lithic assemblage consists of a mano and a wedge collected from the surface of the site and a middle stage biface (Fort Hood Gray chert) and a late stage biface (indeterminate white chert) from Levels 1 and 2 in Test Pit 5, respectively (Table 6.123).

Three identified chert types and seven indeterminate chert categories were recovered from AU 1 (Table 6.124). Approximately 10% of the assemblage was identified. As a result of this relatively low identification rate, the indeterminates occurred in greater than expected frequency and all of the identified types occurred in less than expected frequencies when the entire assemblage was considered. When the indeterminates were excluded, Heiner Lake tan occurred in less than expected frequency, while Fort Hood Yellow and Owl Creek Black occurred in the expected range (Table 6.125). The indeterminates were overwhelmingly dominated by light brown flakes (75% of the total assemblage), suggesting that both Fort Hood Yellow and Heiner Lake Brown are

Table 6.122 Projectile Points, AU 1, 41CV1023.

	Lithic Material				
Point Type	06-HL Tan	14-FH Gray	Indet Dk Brown	Indet Lt Brown	Total
Marshall	0	1	0	0	1
Scallorn	0	0	1	1	2
Untyped Dart	1	0	0	0	1
Total	**1**	**1**	**1**	**1**	**4**

Table 6.123 Nonprojectile Point Lithic Tools, AU 1, 41CV1023.

	Tool Type				
Lithic Material	late stage biface	mano	middle stage biface	wedge	Total
14-FH Gray	0	0	1	0	1
Indet Lt Brown	0	0	0	1	1
Indet White	1	0	0	0	1
Quartzite	0	1	0	0	1
Total	**1**	**1**	**1**	**1**	**4**

probably also a significant component of the unidentified assemblage. Approximately 95% of the identified assemblage is composed of North Fort province material, while the Southeast Range is represented by a single flake.

The size distribution is moderately skewed toward the smaller end, with a modal peak in the 0.5 to 0.9 cm range (Table 6.124). Approximately 86% of the flakes are decortified. While the abraded cortical flakes are slightly more numerous than unabraded cortical flakes, the majority (72%) are indeterminate, and a statement about the relative importance of streambed procurement is therefore unwarranted (Table 6.126). Overall, the assemblage suggests a full range of lithic reduction activity, with a slight emphasis on latter stage reduction.

No faunal material was collected from any of the excavations in AU 1.

6.13.2.2 Excavations in the Burned Rock Midden

Feature 5 is situated next to a 4 m high bluff above the unnamed drainage on the western side of the site. The feature is a burned rock midden, the base of which rests directly on an ancient strath terrace cut into limestone bedrock. A trail and a bulldozer or tank push pile have impacted a portion of the feature, but the majority appears to be intact. The feature measures approximately 9 m north to south x 16 m east to west, and contains no surface depressions other than the impacted areas.

Table 6.124 Debitage Recovery by Size and Material Type, AU 1, 41CV1023.

	Size (cm)						
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types							
06-HL Tan	0	0	0	1	0	0	1
08-FH Yellow	1	4	3	3	0	0	11
17-Owl Crk Black	1	2	1	0	4	1	9
Subtotal	*2*	*6*	*4*	*4*	*4*	*1*	*21*
Unidentified Types							
Indet Black	0	2	0	0	0	0	2
Indet Dk Brown	0	5	2	1	0	0	8
Indet Lt Brown	12	76	22	20	26	1	157
Indet Misc.	0	0	1	1	0	0	2
Indet Mottled	0	0	1	0	0	0	1
Indet Trans	1	1	2	0	0	0	4
Indet White	3	8	2	1	0	0	14
Subtotal	*16*	*92*	*30*	*23*	*26*	*1*	*188*
Total	**18**	**98**	**34**	**27**	**30**	**2**	**209**

On the surface immediately surrounding the feature, there are numerous lithic artifacts that apparently represent procurement of lithic raw materials from a wide variety sources, including Owl Creek Black chert from the North Fort Province.

Table 6.125 Binomial Statistic Results, AU 1, 41CV1023.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
06-HL Tan	1	40	65	less	3	11	less
08-FH Yellow	11	40	65	less	3	11	expected
17-Owl Crk Black	9	40	65	less	3	11	expected
Total Indet	189	40	65	more	na	na	na

Table 6.126 Debitage Cortex Characteristics by Material Type, AU 1, 41CV1023.

	All Cortex		Partial Cortex				
Lithic Material	Abraded	Indeterminate	Abraded	Unabraded	Indeterminate	No Cortex	Total
Identified Types							
06-HL Tan	0	0	0	0	0	1	1
08-FH Yellow	0	0	1	0	3	7	11
17-Owl Crk Black	0	0	0	0	0	9	9
Subtotal	*0*	*0*	*1*	*0*	*3*	*17*	*21*
Unidentified Types							
Indet Black	0	0	0	0	0	2	2
Indet Dk Brown	0	0	1	0	2	5	8
Indet Lt Brown	1	2	2	1	15	136	157
Indet Misc.	0	0	0	0	1	1	2
Indet Mottled	0	0	0	0	0	1	1
Indet Trans	0	0	0	0	0	4	4
Indet White	0	0	0	0	0	14	14
Subtotal	*1*	*2*	*3*	*1*	*18*	*163*	*188*
Total	**1**	**2**	**4**	**1**	**21**	**180**	**209**

Two test pits (TPs 6 and 7) were placed on F 5. Each was excavated to bedrock at approximately 30 cmbs. Test pit 6 (Figure 6.86) was placed on the eastern portion of the feature. Numerous burned rocks were recovered from each level, although the frequencies were significantly less than that found in TP 7. Charcoal flecking was observed in the lower levels of the feature. Test pit 7 was placed at the southwestern edge of the feature. Recovery included high densities of burned rock in each level. In addition, a single flake was found in Level 1 (0 to 10 cmbs).

In both test pits, burned rock frequencies were highest in the upper level and decreased with depth. A total of 344 pieces (40 kg) were recovered from TP 6 and 1,061 pieces (239 kg) were recovered from TP 7. The rock ranged from small, angular fragments to reddened tabular slabs reaching 20 cm long x 15 cm wide x 5 cm thick. In all cases, the larger slabs were horizontally lying. Unburned pieces of limestone bedrock were found in the lower level of the test pits. Although vertical excavations are not an effective means for identifying internal structure in burned rock features (Howard 1991), no internal structure was observed in the profiles of the unit excavations.

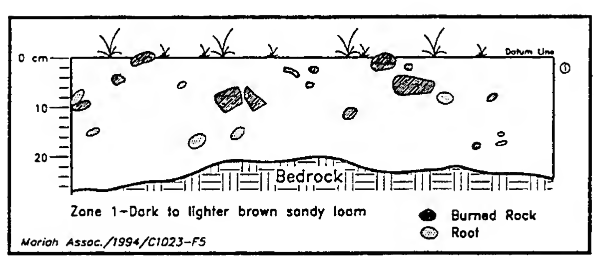

Figure 6.86 Profile of South Wall, TP 6, 41CV1023.

No lithic tools or faunal remains were recovered from the feature. Lithic debitage recovery was limited to a single flake of indeterminate light brown chert.

6.13.2.3 Excavations in the Incised Drainage

Two backhoe trenches were excavated in Subarea C, near the northern end of the site. The density of vegetation and the scarp bordering this portion of the site combined to make access for a backhoe very problematic. The trenches were situated as far into this subarea as could be easily and safely negotiated without cutting trees. Both trenches were excavated to a depth of 2 mbs and exposed a late Holocene alluvial fill. This deposit is relatively fine grained along the margins of the valley, as exemplified by BT 1 (Figure 6.87) which was located immediately west of the eastern valley scarp, and coarser in the valley axis, as was demonstrated by BT 2 (Figure 6.88) which was placed adjacent to the channel in a bar-like landform created by flood scour. The soils formed in this alluvium were weakly expressed and exhibited A-AC-C or AC-C profiles and pedogenic carbonate development was minimal, so the alluvium is tentatively equated with the Ford Alluvium of Nordt (1992). No cultural material was detected in either of the trenches, and investigations in the subarea were terminated.

6.13.3 Conclusions and Recommendations

Although no cultural material was observed in either of the trenches in Subarea C, this should not be considered a definitive demonstration that no cultural material is present in this alluvium within the site boundaries. Due to the access problems presented by vegetation and topography in this portion of the site, comprehensive subsurface examination was not performed and therefore the potential for substantial buried occupations at depths below 40 cm remains largely unknown. The results of the trenching confirm the relatively young age of this alluvium and indicate that this deposit is probably of late Holocene age. Direct correlation of this deposit with Nordt's (1992) results is problematic, but field evidence suggests that this deposit probably correlates with the Ford alluvium.

Except for three roads crossing the site and a bulldozer push pile on F 5, the upland portion of the site appears to be relatively undisturbed. The surface near the roads is actively eroding, but other portions of the uplands appear to be in relatively good condition. Nevertheless, many of the cultural deposits in Subarea A are either at the surface or shallowly buried. However, in places (TPs 3 and 5), they are embedded in a soil matrix that may indicate preservation of discrete components. The shallow nature of the depositional context near the test pits implies that the significance of the artifactual evidence by itself is marginal in some places at the site. However, four of the test pits (TPs 1, 2, 4, and, to a lesser extent, 3) were placed over features immediately adjacent to disturbances on actively eroding surfaces. Indeed, erosion is partly responsible for creating conditions that exposed these features and led to placement of test pits. The depth and depositional context of TP 5 are probably more representative of general conditions in Subarea A, which implies that cultural deposits may be well preserved in stratigraphic context over much of Subarea A.

Furthermore, there are increasing hints that human activities and land use in the Paluxy context are behaviorally distinct from activities in other contexts, especially with respect to patterns of burned rock utilization, atypically low frequencies of lithics associated with burned rock in Paluxy sites, and an apparently high occurrence of features on the Paluxy surface that contrast with an apparently low occurrence of features on immediately adjacent surfaces. Thus, the marginality of the shallowly buried artifact assemblage is partly offset by the fact that the assemblage is located in a specific context from which marginal data is still very useful for addressing differential land use issues outlined in the Fort Hood research design (Ellis 1994b). One of the most interesting aspects of the results of investigation of AU 1 is the mutual exclusivity

between recovery of lithic debitage and the burned rock features, which may imply spatial segregation of different types of activities. Because features are typically the focus of testing investigation at Paluxy sites, this may help to explain the paucity of chipped stone from reconnaissance and testing efforts to this point.

Importantly, the possible marginal value of the artifact assemblage does not mean that the overall research value of Subarea A is marginal. There currently is a generally low level of understanding of the processes associated with geomorphic change on the Paluxy Sand unit on and in which the cultural materials in Subarea A are located. Combined archeological and geomorphic studies in contexts such as Subarea A would provide a conjunction of artifactual and geomorphic evidence of landscape modification that should provide valuable data for addressing major paleoenvironmental issues outlined in the research design for Fort Hood (Ellis et al. 1994), especially with respect to the timing of erosion and colluviation from upland surfaces. Associations between temporally diagnostic artifacts or chronometrically datable materials (e.g., land snails) and sedimentary/pedological evidence would provide important data with which to examine the timing and nature of episodes of landscape change. Since landscape-change processes comprise a major element of the nonhuman components of the cultural ecological focus of the research design, the capacity for AU 1 to provide data for geoarcheological studies further offsets the limitations that emerge when considering only the artifact assemblage.

Feature 5, a burned rock midden in Subarea D, apparently contains very low amounts of artifacts other than burned rock. Given that middens generally are rich in artifactual materials and have been sought as sources of abundant chronology-building data (cf. Black et al. 1992), F 5 apparently represents a relatively unusual behavioral phenomenon. Because much of this feature is intact, it therefore has high potential to yield data relevant to a distinct range of burned rock midden variability (Hester 1991). Furthermore, because charcoal is present in the midden, it has high potential to contain botanical and ethnobotanical materials that can serve as data for modeling the kinds of floral resources that were associated with the formation of middens. Still further, if the absence of known internal structure

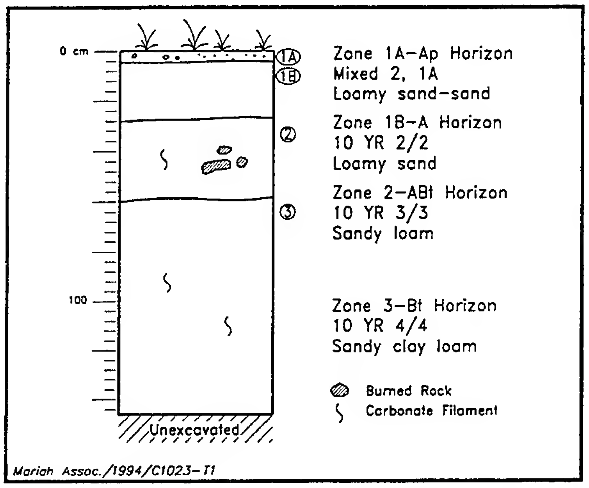

Figure 6.87 Measured Section, BT 1, 41CV1023.

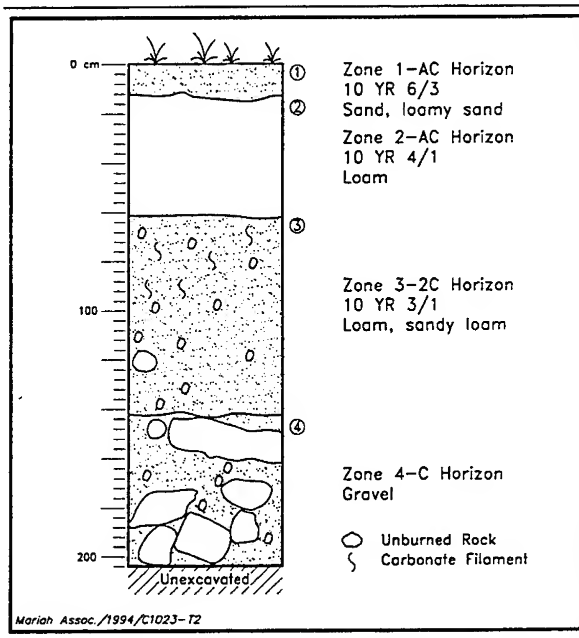

Figure 6.88 Measured Section, BT 2, 41CV1023.

implies that this midden actually has no internal structure, it may be a very useful source of data pertaining to middens that formed as dumps in contrast to those which formed as ovens (Ellis 1994a). Hence, this midden may be extremely useful as a source of data for modeling the technological systems within which rock was burned, which is an explicit aim of the Fort Hood research design (Ellis 1994b).

On the basis of the foregoing, portions of 41CV1023 are judged to be significant and eligible for inclusion in the NRHP by virtue of containing cultural and environmental data that can contribute substantially to the current state of development of prehistory for Central Texas in general, and the Fort Hood area in particular. We therefore recommend that the site be avoided and protected to prevent the loss of significant scientific information. Because the cultural material is shallowly buried, protective measures should include efforts to prevent exposure to earthmoving and uncontrolled traffic (including wheeled vehicles as well as heavy tracked vehicles) across the site. For F 5, additional protective measures should include protection against uncontrolled excavations and further damage from traffic on a nearby trail.

In the event that avoidance and protection are not possible, we recommend backhoe trenches and up to 100 m^2 of manual excavations to mitigate the site. Of this, approximately 25 m^2 should be devoted to F 5, yielding approximately 7.5 m^2 of manual excavations. The midden should be manually excavated using horizontal stripping techniques to identify internal features as much as possible (cf. Howard 1991). Given an apparent low density of artifacts other than burned rocks, sampling should focus on retrieving botanical, chronometric, and other fine-matrix data (Collins 1991) that can be used to infer subsistence and other goals that may have led to formation of the feature (Ellis 1994b). The burned rock itself also should be considered a major data source in order to advance the state of knowledge of burned-rock technologies as called for by the Fort Hood research design (Ellis et al. 1994).

The remaining 75 m^2 should be allocated to the areas immediately surrounding TP 3 and TP 5, for an additional 35 m^2 of manual excavations. The areas surrounding these test pits are relatively undamaged, and cultural materials occur both relatively deeply and in contexts which maximize the potential for preservation of discrete cultural events as well as geomorphically informative data. Backhoe trenches should be used near these areas to identify laterally extensive cultural horizons and to expose profiles for geoarcheological analyses. Additional trenches should be placed in other areas of Subarea A to produce exposures to collect geomorphic data pertaining to landscape change.

The estimates for mitigation do not include potential excavations in Subarea C. If mitigation is to be performed on the site, then portions of Subarea C should be cleared to allow a more comprehensive subsurface sounding, focusing on the margins of the alluvial fill immediately below small rock overhangs which border the margins of this portion of the site. If sounding discloses the presence of intact cultural deposits, an additional volume of excavations would have to be added to the above estimates.

6.14 SITE 41CV1027

6.14.1 Introduction

In March 1992 and again in July 1993, Mariah conducted test excavations at site 41CV1027. The initial investigation was conducted in association with a chronometric study of burned rock mounds on Fort Hood, published previously (Quigg and Ellis 1994). The second phase was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994). The current report summarizes the previously published results, integrates new data from the additional test

excavations, and uses this combined information as a basis to advance a NRHP eligibility determination and management recommendations.

6.14.1.1 Location and Description

41CV1027 is a prehistoric open campsite situated on a series of sloping benches above the east side of Stampede Creek (Figure 6.89). A shallow southeast-to-northwest gully bisects the southern quarter of the site. The site measures approximately 60 x 220 m (13,200 m^2, or about 3.3 acres) and is vegetated with juniper, oak, and greenbriar, with short grasses covering some of the impacted areas (Figure 6.90). The site is partially underlain by the outcrop of the Paluxy Sandstone. For the purposes of this report, the site is considered part of the Stampede site group.

6.14.1.2 Previous Work

The site was first recorded by Turpin during a 1985 survey. He described two burned rock features in poor condition due to vehicle-induced

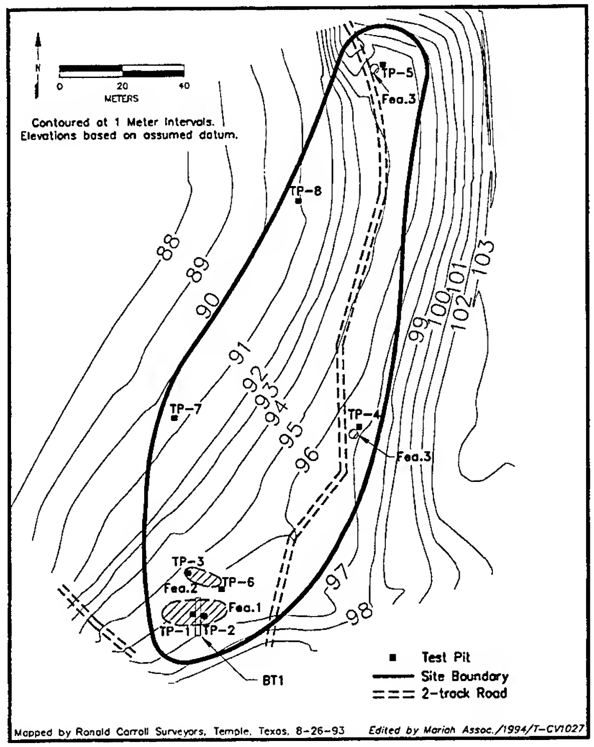

Figure 6.89 Site Map of 41CV1027.

Figure 6.90 Overview of Site 41CV1027, Looking Northeast.

degradation and erosion. No recommendations were given for the site at that time, but the site was observed to be fairly strongly disturbed.

The site was revisited by Quigg and Frederick in February 1992. Archeological and geomorphological assessments completed at that time indicated potential for buried cultural material. A burned rock mound (F 1) and three burned rock concentrations (Fs 2, 3, and 4) were identified during this assessment. A shovel testing crew returned to the site in April 1992, and excavated 19 shovel tests, including one test in each of the four burned rock features. The shovel tests ranged from 20 to 80 cm in depth, with eight encountering possible bedrock. Most cultural material was recovered in the top 20 cm, with a small amount of material from deeper levels. The four features yielded 83% of the cultural material recovered from the site during the shovel testing phase. However, the vast majority of the artifacts were burned rocks; only three lithics were found in the 19 shovel tests. The site was recommended for formal testing, if avoidance was not possible, because of the potential intact cultural deposits (Trierweiler 1994:A1172-A1174). A minimum of six to eight 1 x 1 m manually excavated test units was recommended to test the site, including a 1 x 2 m unit on F 1 (burned rock mound).

6.14.1.3 New Work

Testing on the site was performed during two phases. The first phase occurred in March 1992 in conjunction with a focused study of the burned rock mound, and consisted of a 1 x 1 m unit (TP 1) and a 1 x 0.5 m unit (TP 2) placed next to a backhoe trench (BT 1) through the mound. This phase of work has been reported previously (Quigg and Ellis 1994). The test pits were each excavated to 50 cmbs.

The second phase, conducted in July 1993, consisted of six 1 x 1 m excavation units (TPs 3 through 8) placed near features or positive shovel tests identified during previous work. Two units (TPs 3 and 6) were placed near F 2. Test pits 4 and 5 were placed next to Fs 3 and 4, respectively. Test pits 7 and 8 were excavated near the locations of shovel tests that yielded artifacts during previous site evaluation activities. No backhoe trenches were placed on the site during the second phase. A total of 4.75 m^2 was excavated manually in the second phase. Table 6.127 summarizes treatment units placed on the site during both phases of testing. Recovered cultural material is summarized in Table 6.128.

6.14.2 Results

With the exception of three roads that cut across the site, the matrix shows little sign of recent or historic disturbance. Two benches are located on the site. The upper bench is composed of Paluxy Sands resting on the Glen Rose Limestone formation and the lower bench consists of the Glen Rose formation overlain by shallow slopewash sediments. Test pits 1 through 6 and BT 1 were placed on the upper bench, and TPs 7 and 8 were placed on the lower bench.

Feature 1, tested in the first phase, is a burned rock mound measuring approximately 11 m N-S x 10 m E-W x 50 cm thick on a slope above the Paluxy

Table 6.127 List of Treatment Units, 41CV1027.

AU	Treatment Unit	Length (m)	Width (m)	Depth (m)
1	BT 1	12	0.8	150
1	TP 1	1.0	1.0	50
1	TP 2	1.0	0.5	50
1	TP 3	1.0	1.0	100
1	TP 4	1.0	1.0	30
1	TP 5	1.0	1.0	90
1	TP 6	1.0	1.0	30
1	TP 7	1.0	1.0	90
1	TP 8	1.0	1.0	60

Table 6.128 Artifact Recovery by Test Pit, 41CV1027.

	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
surface	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	1	1	35(16)
1	0	0	3	0	7(0.5)	0	0	0	0	0(0)	0	0	2	0	89(11)	0	0	0	0	31(11.4)
2	0	0	8	0	40(3)	0	0	14	0	62(8)	2	0	5	1	113(16)	0	0	0	0	6(1.5)
3	0	0	20	0	96(10)	0	0	3	0	79(13.5)	0	0	2	0	45(4)					
4	0	0	26	1	37(10.8)	0	0	6	0	36(5)	0	0	7	0	51(15)					
5	0	0	6	0	0(0)	0	0	1	0	24(0.5)	3	0	3	0	182(57)					
6											1	0	1	0	237(84)					
7											2	0	0	0	39(17)					
8											2	0	1	1	18(9.5)					
9											0	0	3	0	5(6)					
10											0	0	0	0	2(5.5)					
TOTAL	0	0	63	1	180(24.3)	0	0	24	0	201(27)	10	0	24	2	781(225)	0	0	1	1	72(28.9)

	TEST PIT 5					TEST PIT 6					TEST PIT 7					TEST PIT 8				
LEVEL	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
surface	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
1	0	0	0	1	24(17.3)	0	0	0	0	15(1)	0	0	0	0	1(0.5)	0	0	0	0	0(0)
2	0	0	0	0	16(10.5)	0	0	0	0	14(2)	0	0	1	0	1(0.2)	0	0	0	0	0(0)
3	0	0	0	0	27(13.2)	0	0	0	1	1(0.3)	0	0	1	0	2(0.2)	0	0	0	0	0(0)
4	0	0	0	0	13(5.5)						0	0	0	0	1(0.2)	0	0	0	0	0(0)
5	0	0	1	0	3(1)						0	0	0	0	2(0.2)	0	0	0	0	0(0)
6	0	0	0	0	0(0)						0	0	0	0	2(0.2)	0	0	0	0	0(0)
7	0	0	0	0	0(0)						0	0	0	0	1(0.2)					
8	0	0	0	0	0(0)						0	0	0	0	0(0)					
9	0	0	0	0	0(0)						0	0	0	0	0(0)					
10																				
TOTAL	0	0	1	1	83(47.5)	0	0	0	1	39(3.3)	0	0	2	0	10(1.7)	0	0	0	0	0(0)

Sand deposits. Measurements are approximate because the feature was heavily disturbed on one side by a road. Burned rock, apparently washed down from the mound, occurs on the surface, downslope from the feature, to the edge of the nearby scarp. Some of this rock also may come from F 2, which is about 20 m north of F 1.

Feature 1 was tested with a backhoe trench and two adjacent test units (TPs 1 and 2) that were excavated to 50 cmbs on an apparently undisturbed portion of the feature (Figure 6.91). Test pit 1 yielded lithics from 0 to 10 cmbs (n=3) and 10 to 20 cmbs (n=10), and a Yarbrough dart point from 30 to 40 cmbs. Burned rock was found in all levels, and snail shells were found from 0 to 20 cmbs. Test pit 2 yielded only burned rock, which

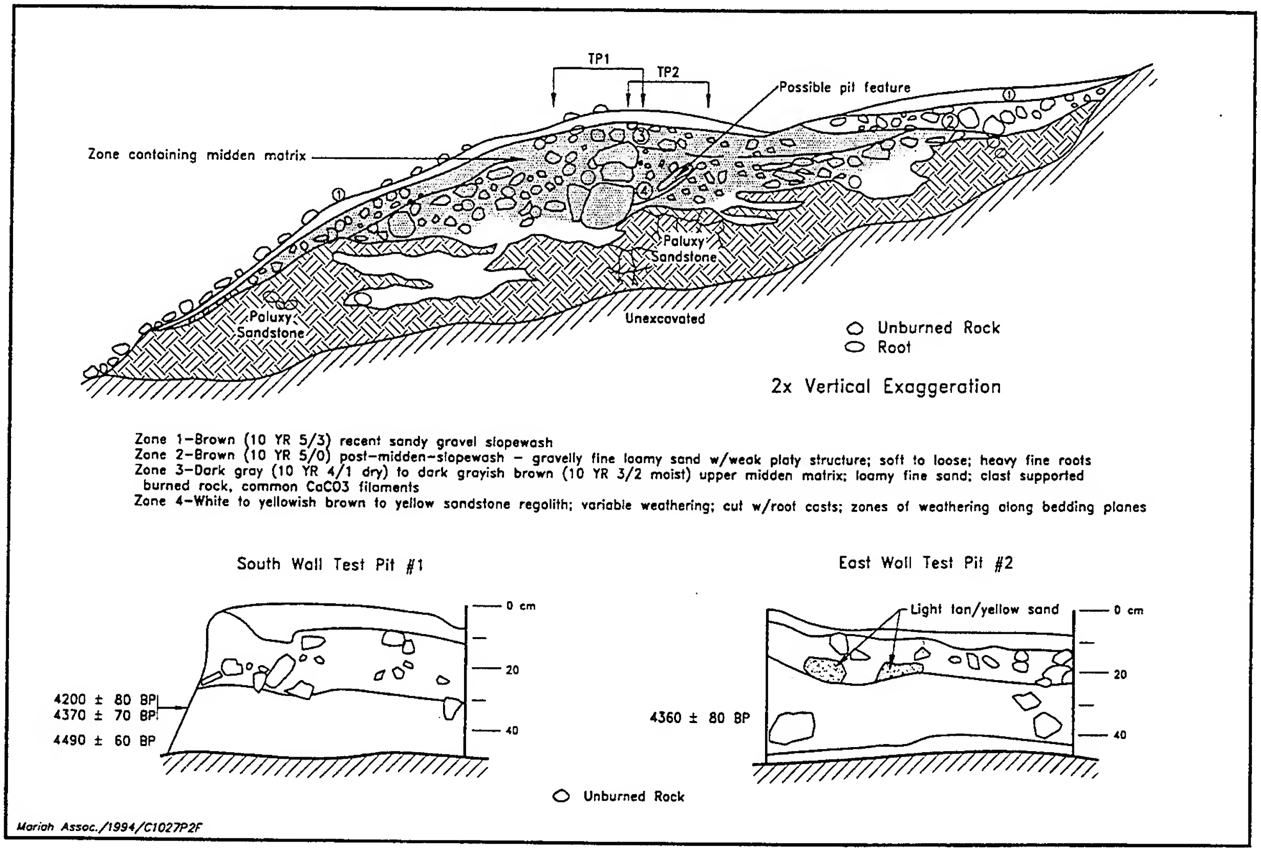

Figure 6.91 Profile of BT 1, South Wall of TP 1, and East Wall of TP 2, 41CV1027.

was recovered in all levels. Charcoal was recovered from the flotation samples from each level.

The profile of F 1 indicates the feature was constructed almost directly on the limestone bedrock, with only a thin Paluxy sand mantle separating the feature from the limestone. A possible pit feature and a possible slab-lined feature were visible in the trench profile. Test pits 1 and 2 did not encounter any other unambiguous evidence of internal structure, which is not surprising, given that vertical excavation strategies appear to be an ineffective means for locating internal midden features (Howard 1991).

Flotation of matrix from F 1 yielded fine charcoal fragments, four pieces of which were submitted to Beta Analytic for AMS radiocarbon assay. The resulting four ages were tightly clustered, ranging from 4200 ± 60 BP to 4490 ± 60 BP (Quigg and Ellis 1994). The dates are close enough to each other to conclude that they represent short-term, or episodic, formation of F 1 during the early Middle Archaic. A dart point resembling the Yarbrough type was recovered from the same unit and level as two of the dated samples. The point has heavy carbonate deposits and is heavily patinated, which also are consistent with long-term deposition.

The majority of artifacts recovered from the site during the second phase of testing consists of burned rock (n=1,471), with 195 snails, 47 lithics, and 8 mussel shell fragments. Test pit 3 yielded the majority of items, and also contains the deepest cultural material on the site (90 to 100 cmbs). All of the recovered mussel shell was unworked and the majority of snails were *Rabdotus* sp. A

complete Yarbrough dart point was found on the surface of F 2 near TP 3, and a small, possible arrow, point was found in the first level of TP 4 in F 3. Two other unidentifiable dart points were also recovered.

Feature 2 is a burned rock feature initially identified as a burned rock concentration on the basis of burned rocks eroding out of the matrix near the lower edge of the upper terrace. Accurate dimensions of the feature were not obtained, as the majority of the feature appears to be buried under reworked Paluxy sediments; however, an approximate size of at least 12 x 12 m can be inferred based on surface exposure. Results of testing suggest that F 2 is either a buried burned rock mound or a burned rock midden associated with F 1.

Test pit 3 was placed in the possible center of F 2 and excavated to 100 cmbs. Large burned limestone slabs were encountered, mostly from 10 to 60 cmbs (Figure 6.92). Although no unambiguous evidence of internal features was observed during excavation, some slabs remaining in profile appear to have similar slope orientations, possibly indicating that an internal feature is present (Figure 6.93). The fine matrix around the rocks was a brown, silty, sandy loam with no observed charcoal or discoloration. The test pit yielded a small number of lithics (including an untyped dart point and a retouched flake) in all levels except 60 to 70 cmbs and 90 to 100 cmbs. Burned rock and *Rabdotus* sp. snails were found in all levels and mussel shell fragments were found from 50 to 90 cmbs. Large numbers of burned rocks were found from 0 to 70 cmbs, with a peak from 40 to 60 cmbs. Below 70 cmbs, rock counts decreased dramatically. A total of 781 burned rocks (225 kg) were recovered from TP 3. The test pit reached compact, pedogenically unmodified Paluxy Sand at 100 cmbs.

Test pit 6 was placed 8 m upslope from TP 3 in an attempt to find the eastern edge of the feature. Excavation encountered small burned rocks (n=29, 3 kg) in the upper 10 to 15 cm. Other materials were limited to an untyped dart point and a few *Rabdotus* sp. snails from level 3. Interestingly, there apparently is a subsurface thickening of the artifact-bearing sediments between TPs 3 and 6. Therefore, the eastern limit of F 2 and a significant 1 to 1.5 m dip in the subsurface location of the Paluxy Sand occurs somewhere between TPs 3 and 6. This implies that prior to burial, F 2 originally may have been located either in a depression of some sort or at the base of a small scarp. This possible phenomenon, as well as the low frequency of lithic artifacts, has been observed at other burned rock features in the Paluxy context (e.g., 41CV319 and 41CV595).

Feature 3 was initially identified as a burned rock concentration; however, during excavation of TP 4, it was recognized to be a shallow, basin-shaped hearth. The feature is located on the upper bench and is separated from F 2 by a small drainage. The feature was eroding from a V-shaped wedge at the junction of two vehicle trails. The area immediately surrounding the feature is highly disturbed by traffic and erosion. The surface of the intact portion of the feature measures 100 cm north to south x 110 cm east to west x 15 cm deep. Test pit 4 (see Figure 6.93) was placed over the eastern half of the unit and excavated to approximately 40 cmbs. The profile revealed a shallow basin filled with a large amount of fist-size burned rocks. Although burned rock (n=72, 29 kg) was found throughout, other materials were limited to a couple of lithics, including a small, crude projectile point, from the first level. The fine matrix of the feature consisted of a dark gray brown loam with no observed charcoal or staining. The feature rested directly on the compact Paluxy Sand deposit, but no limestone bedrock was observed by the end of excavation. There is no evidence to imply that cultural deposits or features remain intact in the immediate vicinity of F 3.

Feature 4 was a 10 m diameter burned rock concentration located on the northern end of the site, situated on the transitional area between the upper and lower benches. The feature has been heavily disturbed by the intersection of two vehicle

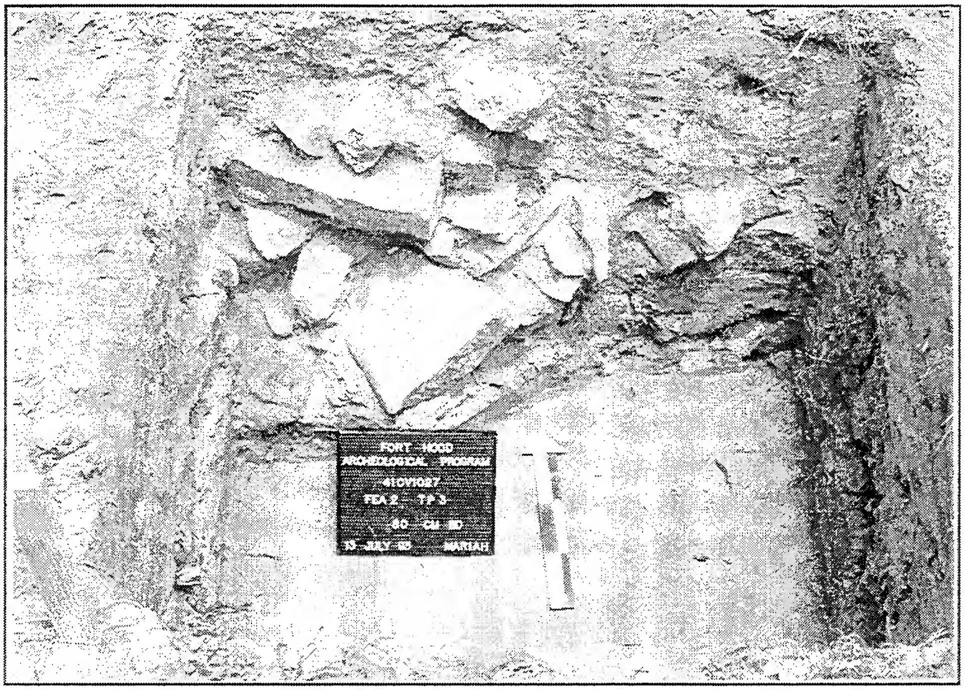

Figure 6.92 Profile of F 2, 41CV1027, Looking North.

trails creating deep ruts to bedrock in the feature area. Test pit 5 was excavated to 90 cmbs in the northeast corner of the feature, which appeared to have the highest degree of remaining integrity. The majority of the unit encountered a sloping bedrock contact and/or compact Paluxy Sand deposits beginning at 40 cmbd. Only a few lithics (n=7) were recovered from 0 to 50 cmbs, and snails were found down to 80 cmbs. Burned rock associated with F 4 was found from 0 to 50 cmbs, with a peak from 20 to 30 cmbs. A total of 83 burned rocks (47.5 kg) were recovered from TP 5. No staining that could be directly attributed to the presence of the feature was observed in the unit. Although no structure was observed during excavation, burned rocks in the profile have an ambiguous structural appearance (see Figure 6.93).

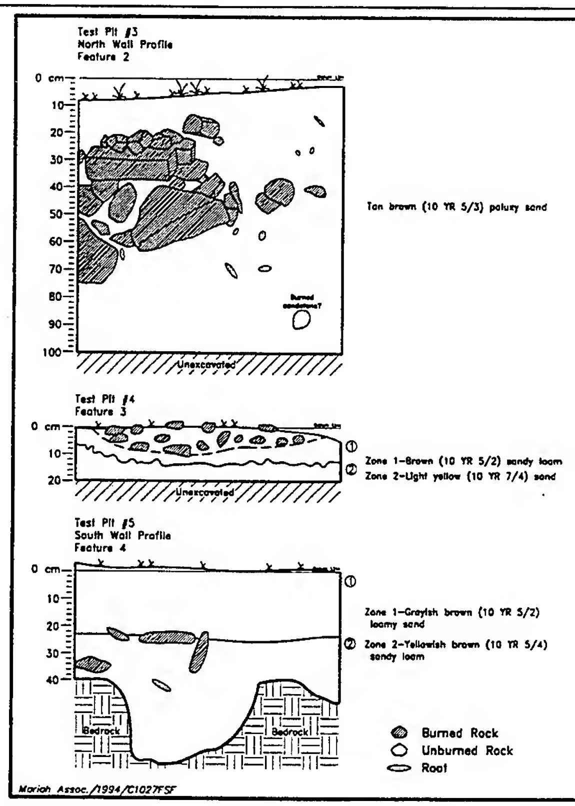

Figure 6.93 Profiles of TPs 3, 4, and 5, 41CV1027.

Test pits 7 and 8 were located on the lower terrace next to previous shovel tests in which burned rock fragments were found. Test pit 7 yielded a few flakes from 10 to 30 cmbs and small fragments of possible burned rock from 0 to 70 cmbs. Snails

were recovered from 0 to 60 cmbs. No features or obvious evidence of occupations were visible in profile. Test pit 8 yielded only seven snails from 0 to 10 cm. These two test pits encountered colluvial limestone gravels intermixed with the Paluxy Sand and possible Walnut Clay; hard bedrock was not encountered in either unit.

After test excavations were complete, Frederick and Ellis visited the site to examine the units for evidence of occupations and stratigraphic integrity. In addition to features described above, they observed an additional, almost entirely buried concentration of burned rock located in a densely vegetated area on the upper bench, approximately 40 m north-northeast of F 2 and 35 m west of F 3. If this concentration is a feature, then at least five features are concentrated on a spatially restricted surface that is dominated by Paluxy Sands. This contrasts sharply with the low occurrence of cultural materials on adjacent surfaces that are not dominated by Paluxy deposits, although some of this contrast may be a result of visibility or the impact of landscape change.

Four projectile points, consisting of one Yarbrough dart point, two untyped dart points, and one untyped arrow point were recovered from this site during the two phases of testing (Table 6.129). One of the points was collected from the surface, and three are associated with features. Represented lithic materials include Heiner Lake Tan (Southeast Range; one point), indeterminate light brown (one point), and indeterminate white (three points). Only two tools, both late stage bifaces composed of indeterminate white chert, were recovered from the excavations. All the artifacts classified as indeterminate white cherts have been heavily patinated, suggesting that the chert was possibly not originally white.

A total of 28 pieces of debitage, all composed of indeterminate chert varieties, were recovered from the site. The majority (86%) of this material was smaller than 1.8 cm, and only one piece (4%) exhibited cortex, indicating that latter-stage reduction predominated. Faunal material was limited to ten mussel shells, five representing *Ambleminae* sp. and five unidentifiable.

6.14.3 Conclusions and Recommendations

Feature 1, a burned rock mound, apparently contains low amounts of artifacts other than burned rock. It therefore represents a good example of an upland burned rock feature that is structurally and artifactually distinct from artifact-rich middens typical of the lowland areas of Fort Hood (see Chapter 8.0). Because the functional significance of these upland features is poorly known, it has high potential to provide data for reconstruction of burned rock technologies (per Ellis 1994b), and because charcoal is present in the mound, it has high potential to contain botanical and ethnobotanical materials that can inform on the kinds of floral resources that were associated with the formation of middens. Still further, there are increasing hints that human activities and land use in the Paluxy context are behaviorally distinct from activities in other contexts, especially with respect to patterns of burned rock utilization, atypically low frequencies of lithics associated with burned rock in Paluxy sites, and an apparently high occurrence of features on Paluxy surface contrasting with an apparently low occurrence of features on immediately adjacent surfaces. Because portions of this feature are intact, it therefore has high potential to yield data relevant to a distinct range of burned rock midden variability (Hester 1991). Feature 2 and the possible buried feature located after test excavations, have similar potential. Feature 2 also yielded some mussel shell fragments. Because the site is on an upland setting, this implies that the feature has the potential to provide insight into the use of forager- and/or collector-organized technologies by occupants of the site.

The presence of some apparently structured burned rock in F 4 implies that some intact deposits remain in undisturbed off-road contexts near that feature. However, the value of this area of the site is probably largely limited to its capacity to yield data relevant to landscape issues in the research

Table 6.129 Projectile Points, AU 1, 41CV1027.

	Lithic Material			
Point Type	06-HL Tan	Indet Lt Brown	Indet White	Total
Yarbrough (F-1)	0	1	1	2
Other Arrow (F-3)	0	0	1	1
Other Dart	1	0	(F-2) 1	2
Total	**1**	**1**	**3**	**5**

design for Fort Hood (Ellis et al. 1994). The stratigraphic relationship between TP 6 and F 2 shows that there is a very high likelihood of finding significant geoarcheological data in these areas. Given that there currently is a low level of understanding of the processes associated with geomorphic change on the Paluxy Sand formation, the areas around Fs 2 and 4 have substantial geoarcheological value as a source of data for addressing paleoenvironmental and paleoclimatic issues. The portions of the site near F 3 and on the lower terrace appear to have limited potential to yield intact cultural materials, although the stratigraphy of the lower terrace is highly likely to be a good source of geoarcheological information.

On the basis of the above, we judge 41CV1027 to be significant and eligible for inclusion in the NRHP by virtue of containing cultural and environmental data that can contribute substantially to the current state of prehistory development for Central Texas in general, and the Fort Hood area in particular. We therefore recommend that the site be avoided and protected to prevent the loss of significant scientific information. Because significant deposits occur in shallowly buried contexts and on the surface immediately adjacent to trails (especially near F 1), portions of the site require measures to protect them against traffic by tracked and wheeled vehicles. Other significant deposits are not near trails, but are in shallowly buried contexts. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, (2) prevent mechanical or manual excavations by military personnel, and (3) minimize the impact of further vehicular traffic.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1993.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 100 m^2 in area, and backhoe trenches. Manual excavations should focus on the areas around Fs 1, 2, and 4, and the burned rock concentration northeast of F 2. Given that the average depth of deposits is approximately 60 cm, total volume of manual excavations will be approximately 60 m^2. Backhoe trenches should be excavated to allow geoarcheological studies and to elucidate stratigraphic relationships between F 1, F 2, and the rock concentration northeast of F 2. Some backhoe trenches should be allocated to the lower terrace for geoarcheological studies. It is possible that such trenches will reveal discrete cultural deposits that are not currently known. If such deposits exist, it would be important to mitigate them. Such mitigation, if necessary, would add an unknown volume of manual excavations to the estimate above.

6.15 SITE 41CV1038

6.15.1 Introduction

In late February and early March 1994, Mariah conducted test excavations at site 41CV1038. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.15.1.1 Location and Description

Site 41CV1038 is located on Cowhouse Creek in the West Cowhouse site group. The site is situated on a complex series of terraces above a confluence with an unnamed tributary (Figure 6.94). The deep, unnamed drainage defines the eastern site boundary. Two burned rock middens are located on the highest terrace, both of which are traversed by a trail (Figure 6.95). Maximum site dimensions are 140 x 130 m (about 18,000 m^2, or 4.5 acres).

6.15.1.2 Previous Work

This site was initially recorded by Turpin and Michaels on 10 May 1985, as a lowland campsite containing two dissected burned rock "mounds." A low density of debitage, mussel shell, and a few biface fragments were observed in association with the burned rock. The site was estimated to be 40% disturbed by tracked vehicles and erosion and the alluvial deposits present at the site were estimated to be 0.5 to 2.0 m thick.

Quigg and Frederick revisited the site in January 1992 and reevaluated the site on archeological and geomorphic observations. The site was divided into Subarea A (T_{1A} and T_{1B} Holocene terraces) and Subarea B (T_0 floodplain terrace). The previously recorded burned rock "mounds" were relocated and reinterpreted as large, thin (less than 40 cm thick) burned rock concentrations restricted to Subarea A. An abundance of burned rock and lithics were observed on exposed areas and appeared to be shallowly buried elsewhere. No cultural material was observed in Subarea B. No

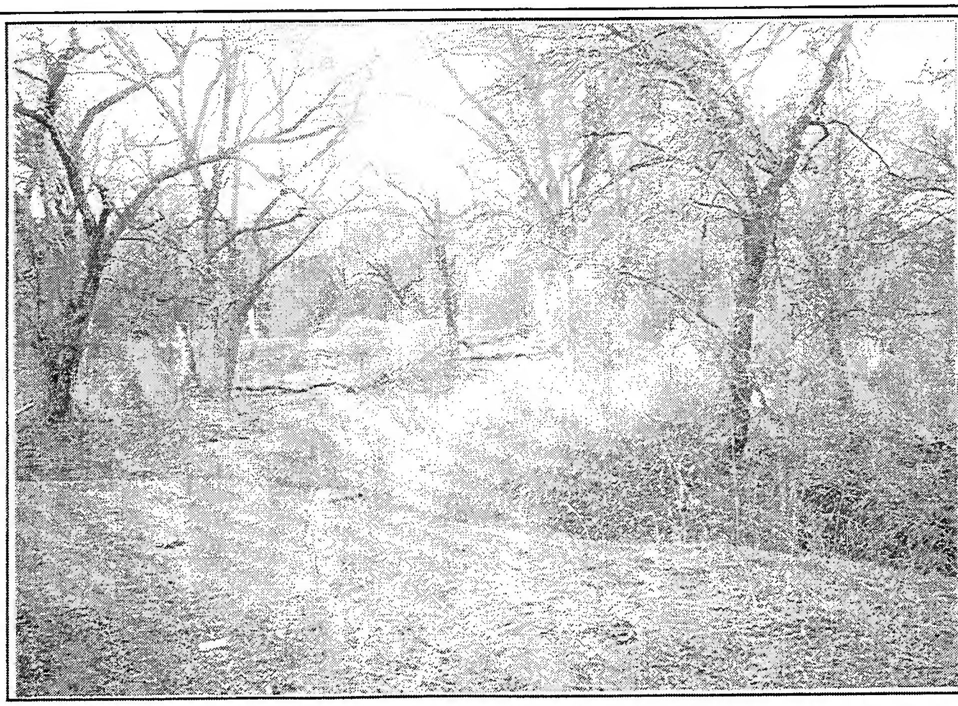

Figure 6.94 Overview of Site 41CV1038, Looking South.

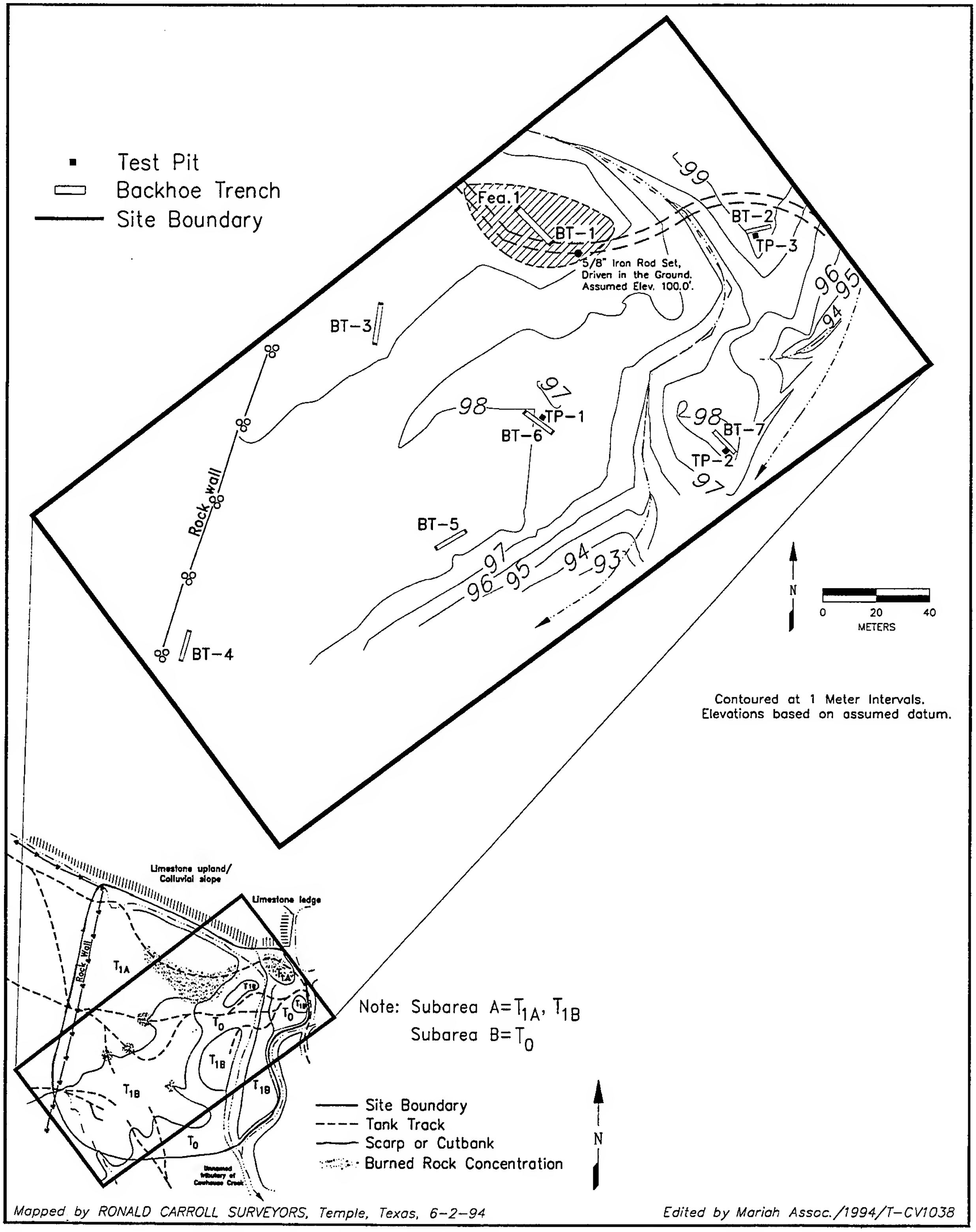

Figure 6.95 Site Map of 41CV1038.

further management was recommended for Subarea B. Because Subarea A had the potential to contain intact cultural deposits, 19 shovel tests were excavated. Of these tests, 79% were positive and recovered items included 75 burned rocks, 71 flakes, 20 bone fragments (5 burned), 20 mussel shells, and 3 pieces of historic metal. These items were primarily recovered from the upper 40 cm, but some material was recovered to a depth of 60 cmbs. The shovel tests excavated in the areas of observed burned rock yielded the majority of recovered artifacts. The results of shovel testing suggested that Subarea A might contain intact cultural material, but the subarea's archeological potential remained uncertain. Subarea A was recommended for avoidance or for formal testing if avoidance was not possible. Six to eight m^2 of manually excavated test pits and backhoe trenches were recommended for formal testing to determine NRHP eligibility (Trierweiler 1994:A1186-A1190).

6.15.1.3 New Work

Seven backhoe trenches (BTs 1 through 7) were placed on the site in order to examine internal stratigraphy and prospect for buried cultural material. Backhoe trenches 1 through 4 were placed on the higher T_{1A} surface, and BTs 5 through 7 were situated on the T_{1B} surface. Cultural material was detected in every trench but BT 4, but the most significant deposits were contained in BTs 1, 2, 6, and 7. Three 1 x 1 m test pits (TPs 1 through 3) were offset from BTs 6, 7 and 2, respectively (Table 6.130). Recovered cultural material is summarized in Table 6.131. The burned rock concentrations/"mounds" identified by previous investigators were designated Fs 1 and 2. Observations of the features were based on surface exposure and the results of excavation.

6.15.2 Results

To facilitate analysis, the site was subdivided into two analytical units (AU 1 and AU 2), which corresponded to the T_{1A} and T_{1B} terraces, respectively; each is addressed separately below.

Table 6.130 List of Treatment Units, 41CV1038.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cm)
1	BT 1	16	0.8	260
1	BT 2	6	0.8	300
1	BT 3	10	0.8	290
1	TP 3	1.0	1.0	210
1	BT 4	10	0.8	320
2	BT 5	8	0.8	290
2	BT 6	10	0.8	260
2	BT 7	6	0.8	250
2	TP 1	1.0	1.0	80
2	TP 2	1.0	1.0	250

6.15.2.1 Excavations in the T_{1A} Terrace

Feature 1 is a burned rock midden located at the north-central portion of the site on the high T_{1A} surface. An abundance of burned rock, some debitage, bone, and mussel shell was observed on the surface of F 1. Apart from some surficial disturbance by a two-track road, the midden appeared to be relatively undisturbed, and its dimensions were estimated at approximately 60 m long x 25 m wide.

Trench 1 (Figure 6.96) was situated at the rear of the terrace on F 1. The trench was capped by a relatively diffuse, black (10YR 2/1), loamy midden deposit approximately 35 cm thick. Numerous burned rocks, mussel shells, and bone fragments were observed in the midden along the entire length of the trench. This cultural zone was underlain by 40 cm of massive, very dark to dark grayish brown (10YR 3/2 to 10YR 4/2) clay loam. These upper two zones probably represent a drape of more recent late Holocene alluvium overlying the terrace core. Three zones composed of dark grayish brown to brown (10YR 4/2-10 YR 5/3), silty loam were exposed beneath this probable unconformity. The upper zone exhibited a weak, fine blocky structure and contained a lens of

Table 6.131 Artifact Recovery by Test Pit, 41CV1038.

	TEST PIT 1					TEST PIT 2					TEST PIT 3				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	0	0	0(0)						0	0	0	0	0(0)
2	0	0	0	0	0(0)						0	0	0	0	0(0)
3	0	0	0	0	0(0)						1	9	17	2	39(3)
4	0	0	0	0	0(0)						0	8	7	1	10(0.5)
5	0	93	0	0	54(29)						13	0	1	0	10(0.5)
6	0	56	24	3	2(0.3)			not screened			9	2	3	0	4(0.5)
7	0	3	7	2	6(24)						1	0	3	0	4(1)
8	0	12	4	0	12(2.5)						0	0	0	0	31(15)
9											0	1	0	0	0(0)
10											0	3	2	1	3(1)
11											0	14	0	0	1(0.3)
12						0	0	0	0	0(0)	1	3	0	0	0(0)
13						0	0	2	0	0(0)	0	0	0	0	2(0.5)
14						0	0	5	0	0(0)	0	0	0	0	4(1)
15						0	0	1	0	0(0)	0	0	0	0	2(0.5)
16						0	10	6	0	4(0.5)	0	0	0	0	2(0.3)
17						4	0	11	0	27(2.5)	0	0	0	0	2(0.3)
18						3	0	21	2	11(1.5)	0	1	0	0	2(0.5)
19						0	0	1	0	105(35)	0	0	0	0	97(29)
20						0	2	6	0	0(0)	0	0	0	0	2(0.3)
21						0	12	7	0	9(1)	0	0	0	0	2(0.3)
22						1	2	1	2	17(3)					
23						1	1	10	1	0(0)					
24						0	0	4	0	1(0.5)					
25						0	1	0	0	3(0.5)					
TOTAL	0	164	35	5	74(55.8)	9	28	75	5	177(44.5)	25	41	33	4	217(54.5)

burned rock at a depth of approximately 1 mbs. Fine carbonate filaments extended throughout all three of these lower zones, and a few fine, stream-rounded limestone gravels were present in the lowest zone. Overall, the exposure exhibited an A-Bw-2Bk profile. It is currently unclear whether this unit represents the West Range fill or the older Fort Hood fill (Nordt 1992), but the former seems more likely.

Feature 2 is a burned rock concentration also located on a high T_{1A} surface at the northeastern corner of the site. It was limited to an isolated remnant of the T_{1A} surface near the point where the tributary emerges into the Cowhouse Creek valley, and measured approximately 25 m long x 15 m wide. A high quantity of cultural material, including burned rock, debitage, mussel shell, a mano, and a metate, was exposed by erosion of stratified cultural zones on the flanks of the isolated T_{1A} surface remnant, particularly in the two-track road that crossed the feature.

Trench 2 (Figure 6.97) was situated on F 2. Six zones and a possible unconformity were identified. Zones 1 to 3 graded down from black loam to dark grayish brown clay loam (10YR 4/2) through the upper 120 cm of the deposit. Several discrete

cultural zones, including burned rock, mussel shell, and flakes, were noted at depths of approximately 20 cm, 40 cm, and 65 cm. These deposits are interpreted as probable upper West Range fill. The assumed contact between this unit and the underlying deposits, which is probably equivalent to the lower West Range but may in fact represent the Fort Hood, was also mantled with a distinct lag of burned rock clasts at approximately 120 cmbs. The underlying material consisted of weak, subangular blocky structured, dark grayish brown (10YR 4/2) clay loam containing common carbonate filaments. A distinct, dipping surface mantled with burned rock was present approximately 170 to 190 cmbs. The trench was discontinued approximately 280 cmbs, and exhibited an overall A-B1w-B2k-B3k profile.

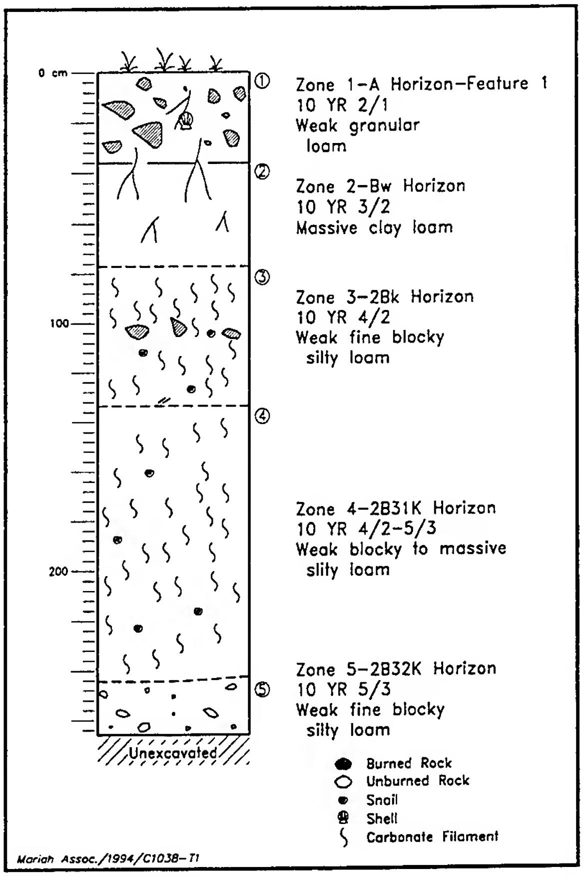

Figure 6.96 Measured Section, BT 1, 41CV1038.

Test pit 3 was offset from the southern wall of BT 2 and excavated to 210 cmbs. No cultural material was recovered from the upper level, but several burned rocks were found in the following level. Recovery increased dramatically from 20 to 30 cmbs, with numerous burned rocks, several flakes and bone fragments, and a mussel shell found. From 30 to 70 cmbs, artifact frequencies steadily declined, although several burned rocks and flakes, bone fragments, and mussel shells continued to be found. In addition to these artifacts, a Marcos point was recovered from 30 to 40 cmbs, and an AMS radiocarbon age of 1140 ± 60 BP (Beta b-75159) was obtained from charcoal in the flotation sample collected from Level 7 (60 to 70 cmbs), supporting the interpretation that the fill is equivalent to Nordt's (1992) Upper West Range.

At 73 to 82 cmbs, the burned rock frequency increased markedly. This concentration of burned rock was designated F 5, and was composed of a total of 35 subangular burned rocks (15 kg), of which, 20 were concentrated along the west wall of TP 3 (possibly the edge of a hearth) and 15 were scattered across the remainder of the pit (see Figure 6.97). The size of the rock ranged from gravels up to pieces measuring 17 x 13 x 6 cm. The feature was no more than two tiers of rock in thickness. Although only burned rock was found within the feature, the feature extends for an unknown length to the west and south. Although not directly dated, the radiocarbon age from immediately above the feature and lack of an obvious unconformity at the top of the feature suggest that it probably dates to the early phases of the Late Prehistoric.

The level below F 5 yielded a single bone fragment. Several bone fragments were found in the subsequent 3 levels (peaking at 100 to 110 cmbs), along with a few flakes and burned rocks. From 120 to 180 cmbs, a few burned rocks were found within each level and a mussel shell was also found at 170 to 180 cmbs. At 182 to 194 cmbs, F 6 was encountered. It was an ovate, slightly basin-shaped hearth composed of 97 burned rocks (29 kg) and a matrix containing small

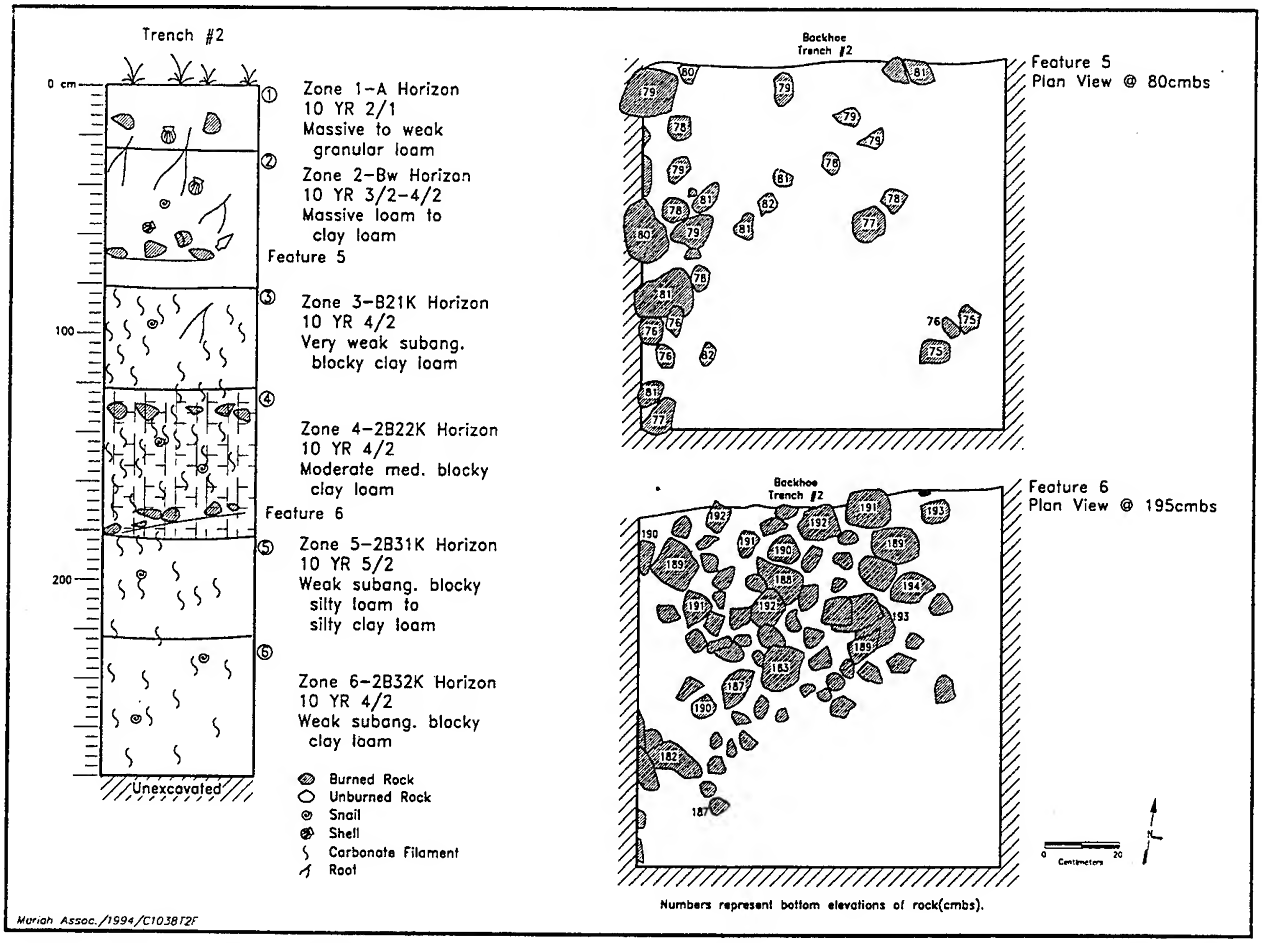

Figure 6.97 Measured Section, BT 2, and Plans of F 5 (80 cmbs) and F 6 (195 cmbs), 41CV1038.

charcoal flecks (see Figure 6.97). The feature measured 87 cm long x 63 cm wide. The majority of the rocks were tabular in shape, however, subangular pieces were also present. The size of the rock ranged from 4 to 14 cm in maximum dimension. Placement of the rock appeared to be irregular, although portions of the hearth contained two to three tiers of rock. Although the northern edge of the feature had been impacted by the backhoe during trenching and a small scatter of burned rock trailing to the southeast suggested some deflation had occurred, the majority of the feature appeared to be intact. No lithics, bone, or mussel shell were found in association, but an AMS radiocarbon age obtained on charcoal from the feature matrix yielded a corrected age of 3720 ± 60 BP, indicating that the feature is of Middle Archaic age and contained in the Lower West Range fill. Below F 6, a couple of burned rocks were recovered from 194 to 210 cmbs, where the test pit was discontinued.

Trench 3 was placed on the T_{1A}/T_{1B} scarp south of BT 1 and revealed four zones. Zone 1 was 25 cm thick and consisted of black (10YR 2/1) loam. It exhibited a pronounced platy structure due to compression by vehicles and contained sparse burned rock. Zone 2 was 75 cm thick and consisted of massive, very dark grayish brown (10YR 3/2) silty loam. Zone 3 was 100 cm thick and consisted of dark grayish brown (10YR 4/2), moderate, coarse blocky structured silty clay loam. It contained common carbonate filaments and *Rabdotus* sp. shells. Zone 4 extended to the base of the trench at approximately 260 cm and consisted of brown (10YR 4/3), massive, loamy, fine sands. Although the contact between Zones 2

and 3 may represent an unconformity between the upper and lower members, the whole sequence probably represents the West Range fill. Overall, the exposure exhibited an A-Bw-Bk-C profile. A few burned rocks were observed within the upper Zone 1 and no cultural material was detected below.

Trench 4 consisted of approximately 90 cm of sandy loam exhibiting an A-Bw horizon sequence overlying a thick accumulation of loamy channel-proximal sands. The unit may represent a thick drape of Ford sediments over West Range sands, or may all represent the West Range fill. No cultural material was detected in the trench.

A Lange dart point of Southeast Range Heiner Lake Tan chert and a Marcos dart point of Indeterminate Dark Brown chert were recovered from this AU ; both points were from BT 2. Two side scrapers, and one preform were the only chipped stone tools recovered. Only one of side scrapers is of an identifiable chert variety (Table 6.132).

A small but diverse debitage composed of eight identified chert types and five indeterminate chert categories was recovered from AU 1 (Table 6.133). Overall, 40% of the assemblage was identified. When the entire assemblage was considered, the aggregate indeterminates occurred in greater than expected frequency and all identified types occurred in expected frequencies. When the indeterminates were excluded, Fort Hood Yellow occurred in greater than expected frequency and the remainder of types occurred in the expected range (Table 6.134).

Three of the four recognized chert provinces are represented in the assemblage. North Fort cherts (Texas Novaculite, Fort Hood Yellow, and Fort Hood Gray) make up 54% of the identified assemblage. The relative percentage contributed by the Southeast Range and Cowhouse provinces is unclear because Heiner Lake Translucent Brown, which is generally considered a Southeast Range variety, is also known from the Cowhouse bedload.

Table 6.132 Nonprojectile Point Lithic Tools, AU 1, 41CV1038.

	Tool Type		
Lithic Material	preform	side scraper	Total
06-HL Tan	0	1	1
Indet Lt Brown	0	1	1
Indet Lt Brown	1	0	1
Total	**1**	**2**	**3**

Table 6.133 Debitage Recovery by Size and Material Type, AU 1, 41CV1038.

	Size (cm)					
Lithic Material	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types						
05-Texas Novac	0	0	0	0	1	1
08-FH Yellow	0	0	2	3	0	5
09-HL Tr Brown	0	0	0	1	1	2
10-HL Blue	0	0	0	1	0	1
14-FH Gray	0	0	0	1	0	1
19-C Dr Gray	0	0	0	1	0	1
22-C Mott/Flecks	0	0	0	0	1	1
25-C Br Fleck	0	1	0	0	0	1
Subtotal	*0*	*1*	*2*	*7*	*3*	*13*
Unidentified Types						
Indet Dk Brown	0	0	2	1	0	3
Indet Dk Gray	1	0	0	0	0	1
Indet Lt Brown	0	1	3	8	1	13
Indet Lt Gray	0	0	0	0	1	1
Indet Trans	0	0	2	0	0	2
Subtotal	*1*	*1*	*7*	*9*	*2*	*20*
Total	**1**	**2**	**9**	**16**	**5**	**33**

Table 6.134 Binomial Statistic Results, AU 1, 41CV1038.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
05-Texas Novac	1	1	7	expected	0	4	expected
08-FH Yellow	5	1	7	expected	0	4	more
09-HL Tr Brown	2	1	7	expected	0	4	expected
10-HL Blue	1	1	7	expected	0	4	expected
14-FH Gray	1	1	7	expected	0	4	expected
19-C Dr Gray	1	1	7	expected	0	4	expected
22-C Mott/Flecks	1	1	7	expected	0	4	expected
25-C Br Fleck	1	1	7	expected	0	4	expected
Total Indet	20	1	7	more	na	na	na

If the latter source is assumed, which is reasonable given the proximity of the Cowhouse channel, then Cowhouse materials (Heiner Lake Translucent Brown, Cowhouse Dark Gray, Cowhouse Mottled/Flecked, and Cowhouse Brown Flecked) make up 38% of the total, while Southeast Range cherts (Heiner Lake Blue) make up 8%. If the Heiner Lake Translucent Brown is instead assumed to originate in the Southeast Range, the relative contribution of the Southeast Range and Cowhouse provinces becomes 23% each.

The majority of flakes are relatively large, with 91% greater than 1.2 cm in size. Two are primary decortification flakes, and 39% possess at least some cortex, suggesting that relatively early-stage reduction activities predominated (Table 6.135). However, the low frequency of artifacts associated with the features suggests that many smaller flakes may have been removed by flowing water. Although the majority of flakes have indeterminate cortex characteristics, those with clear indications of stream transport damage outnumber those clearly unabraded specimens by a ratio of 3:1, suggesting that much of the early-stage reduction probably focused on locally available alluvial chert.

The recovered faunal record was very fragmentary, and little of the material could be identified with specific taxa (Table 6.136). The only identifiable taxon was deer, although most of the indeterminate remains appeared to represent deer- to bison-sized animals. A moderate mussel assemblage, including a minimum of three different species, was also recovered.

One prehistoric ceramic body sherd was collected from the surface of the site. It was incompletely oxidized, once polished but has been eroded. This sherd is one of thicker specimens in the ceramic collection from Mariah's work at Fort Hood. Petrographic analysis has placed the specimen in the bone-tempered, locally made group (see Appendix E).

6.15.2.2 Excavations in the T_{1B} Terrace

Trench 5 was situated on the T_{1B} terrace closest to the modern Cowhouse Creek channel. Approximately 280 cm of sandy to silty loam exhibiting an overall A-Bk-C profile were exposed by the trench. Zone 1 extended to a depth of 40 cm and consisted of massive, very dark brown, sandy loam (10YR 2/2). It is interpreted as a probable drape of more recent (i.e., Ford) overbank sediments overlying a thick accumulation of late Holocene alluvium (probably the upper West Range fill). Zone 2 was 45 cm thick and consisted of very dark grayish brown (10YR 3/2), weak,

blocky, silty loam. It graded into 140 cm of very weak, blocky, grayish brown (2.5Y5/2 to 10YR 5/2), silty loam containing common carbonate filaments, which was in turn underlain by massive, dark grayish brown (2.5Y 4/2), very fine sandy loam. Observed cultural material was limited to a few sparse burned rocks approximately 2 mbs.

Trench 6 (Figure 6.98) exhibited a broadly similar profile. The surface was capped by a 10 cm zone of laminated silts representing a recent flood drape. The underlying sediments exhibited an A-Bk-C profile. Once again, the A horizon appeared to represent a more recent drape of Ford alluvium welded to the upper West Range fill by subsequent weak soil development. It was roughly 45 cm thick and contained abundant cultural material, including a large basin hearth (F 3) containing very abundant charcoal. The upper Bk horizon (probably the upper West Range) was 40 cm thick and consisted of grayish brown (10YR 5/2), weak, blocky silty clay loam suffused with carbonate filaments. It too contained abundant burned rock and charcoal, and was also notable for an extremely dense concentration of *Rabdotus* sp. shells. Zone 4 consisted of dark grayish brown (10YR 4/2), silty clay loam with common carbonate filaments, and was approximately 65 cm thick. Zone 5 continued to the base of the trench at 240 cmbs, and consisted of massive, grayish brown (2.5Y 5/2), fine sandy loam. A sparse lens of mussel shell was evident at approximately 210 cmbs.

Test pit 1 was offset from BT 6, over F 3, and excavated to 80 cmbs. No cultural material was found from 0 to 30 cmbs. Feature 3 was encountered at 31 cmbs and extended to 54 cmbs. Feature 3 was a 102 cm long x 100 cm wide circular, basin-shaped hearth composed of 54 flat, waterworn, burned limestone cobbles (29 kg), averaging 15 cm long x 10 cm wide (see Figure 6.98). The rocks were staggered one to two tiers thick and placed on the outer edges of the hearth to form a tight circle that encompassed a dense lens of charcoal (Figure 6.99). Three charred large animal bones were found within the upper portion of the feature (40 to 45 cmbs), and a bison rib, several bone fragments and flakes, and one Perdiz and an untyped arrow point were found at or immediately below the base of the feature (50 to 54 cmbs). A radiocarbon age of 361 ± 34 BP (TX-8190) was obtained from the hearth, supporting the implication of a Toyah occupation provided by the Perdiz point. Feature 3 was intact and undisturbed except for the extreme southwestern edge, which was clipped during backhoe trenching. Below F 3, several scattered burned rocks, a few flakes and bone fragments, and a mussel shell were found from 60 to 80 cmbs.

Table 6.135 Debitage Cortex Characteristics by Material Type, AU 1, 41CV1038.

	All Cortex	Partial Cortex				
Lithic Material	Abraded	Abraded	Unabraded	Indeterminate	No Cortex	Total
Identified Types						
05-Texas Novac	0	0	0	1	0	1
08-FH Yellow	0	0	1	2	2	5
09-HL Tr Brown	0	0	0	0	2	2
10-HL Blue	0	0	0	0	1	1
14-FH Gray	0	0	0	0	1	1
19-C Dr Gray	0	0	0	1	0	1
22-C Mott/Flecks	0	0	0	1	0	1
25-C Br Fleck	0	0	0	0	1	1
Subtotal	*0*	*0*	*1*	*5*	*7*	*13*
Unidentified Types						
Indet Dk Brown	1	0	0	0	2	3
Indet Dk Gray	0	0	0	0	1	1
Indet Lt Brown	1	0	0	4	8	13
Indet Lt Gray	0	1	0	0	0	1
Indet Trans	0	0	0	0	2	2
Subtotal	*2*	*1*	*0*	*4*	*13*	*20*
Total	**2**	**1**	**1**	**9**	**20**	**33**

Trench 7 (Figure 6.100) was situated on an isolated remnant of the T_{1B} surface near the tributary channel. The upper 95 cm of the profile consisted of stratified packets of loam, sandy loam, and fine sands 5 to 20 cm thick. This material varied from dark grayish brown to light grayish brown (10YR 4/2-10YR 6/2) as a function of sandiness and organic content, and clearly represented a relatively recent drape. The underlying sediments consisted of an upper dark grayish brown (10YR 4/2), weak subangular blocky sandy clay loam approximately 75 cm thick and a lower grayish brown (10YR 5/2) massive sandy loam. A well-preserved burned rock hearth (F 4) was detected at approximately 190 cmbs.

Test pit 2 was excavated into the safety bench of BT 7, above F 4, and excavated to 250 cmbs. The upper 110 cm of unconsolidated sandy alluvium was removed by the backhoe and was not screened. No cultural material was found from 110 to 120 cmbs, and only a few flakes were

Table 6.136 Faunal Recovery, AU 1, 41CV1038.

	Element					
Vertebrates	Indeterminate	Permanent toot	Radius	left	right	Total
Mammalia	4	0	0	0	0	4
Mammalia (lg/vlg)	1	0	0	0	0	1
Mammalia (med/lg)	18	0	0	0	0	18
Mammalia (very lg)	13	0	0	0	0	13
Odocoileus sp.	0	3	1	0	0	4
Vertebrata	1	0	0	0	0	1
Total	**37**	**3**	**1**	**0**	**0**	**41**
Bivalves						
Amblema plicata	0	0	0	5	3	8
Ambleminae	0	0	0	3	2	5
Cyrtonaias sp.	0	0	0	1	0	1
Lampsilinae	0	0	0	1	2	3
Unionacea	0	0	0	1	0	1
Total	**0**	**0**	**0**	**11**	**7**	**18**

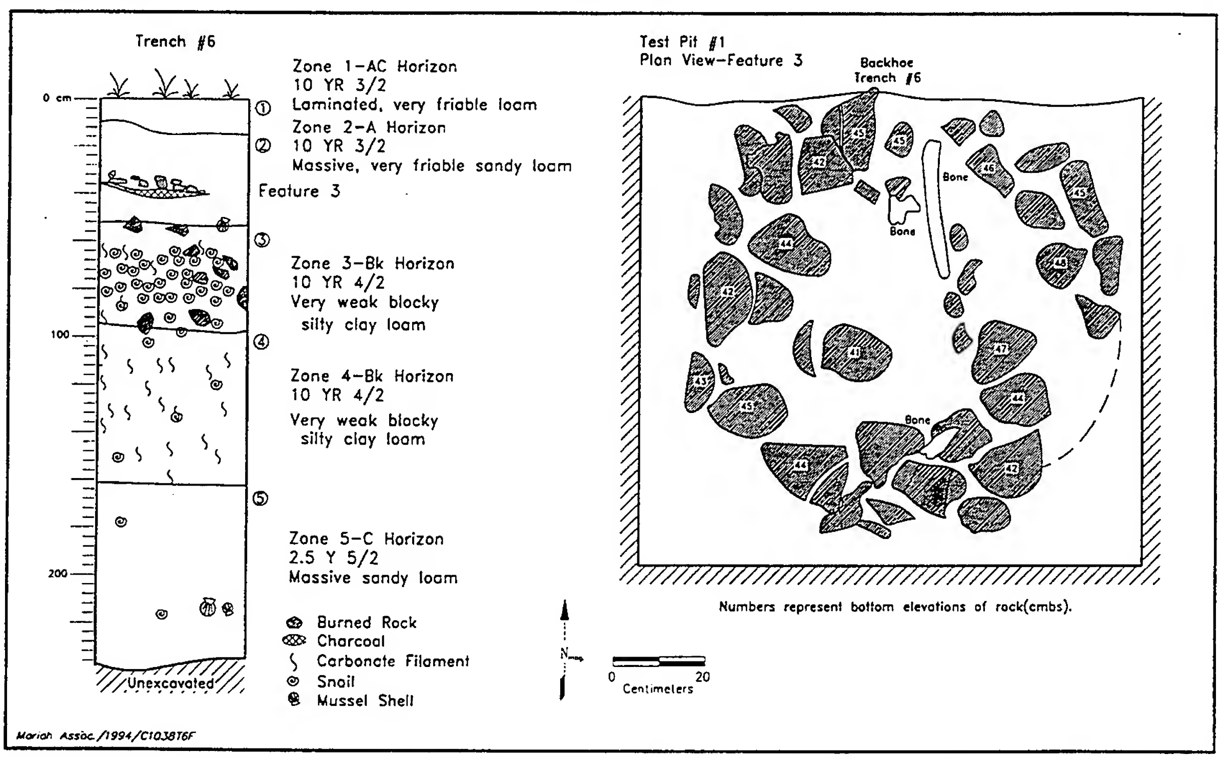

Figure 6.98 Measured Section, BT 6, and Plan of F 3 (50 cmbs), TP 1, 41CV1038.

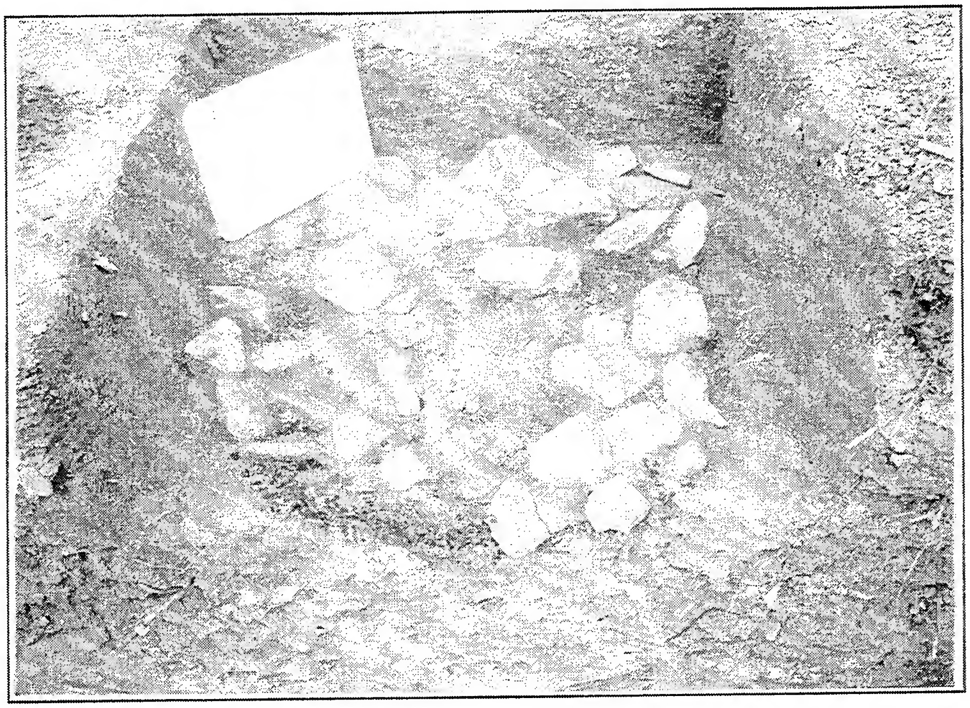

Figure 6.99 Feature 3, 41CV1038, Looking East.

recovered from each level from 120 to 150 cmbs. Recovery increased dramatically from 150 to 175 cmbs, with several burned rocks and flakes and a few bone fragments and mussel shells found. The top of F 4 was encountered at 176 cmbs and the base was reached at 198 cmbs.

Feature 4 (see Figure 6.98) consisted of a 76 cm x 66 cm circular basin-shaped hearth filled with 105 burned subangular and tabular rocks (35 kg total) (Figure 6.101). The size of the rock ranged from pieces 4 x 3 x 2 cm up to pieces 15 x 12 x 6 cm. Several rocks appeared to have been placed along the walls of the hearth, with the internal portion being filled in with two to three tiers of burned rock. The fine matrix contained charcoal flecking and several large chunks of charcoal, which was subsequently identified as Live Oak wood. Feature 4 was intact and undisturbed except for the extreme eastern edge, where the hearth was clipped during backhoe trenching. Several flakes and a couple of bone fragments and mussel shells were recovered from the hearth.

In the majority of levels below F 4 from 200 to 250 cmbs, several small burned rocks, no more than 17 (3 kg) in any given level, and flakes were found. Bone fragments were also found in the majority of these levels.

A Perdiz and an untyped arrow point were recovered from AU 2. They were composed of Heiner Lake Tan (Southeast Range) and indeterminate dark gray, respectively. The general nondebitage chipped stone assemblage consists of ten specimens, including one multiple platform core (Table 6.137). Two of the unifaces are of Heiner Lake Tan chert, while the others are either indeterminate chert types or of Cowhouse chert varieties.

Seven identified chert types and five indeterminate chert categories are included in the debitage assemblage recovered from AU 2 (6.138). Roughly 26% of the total assemblage was identified. When the entire assemblage was considered, the aggregate indeterminates occurred

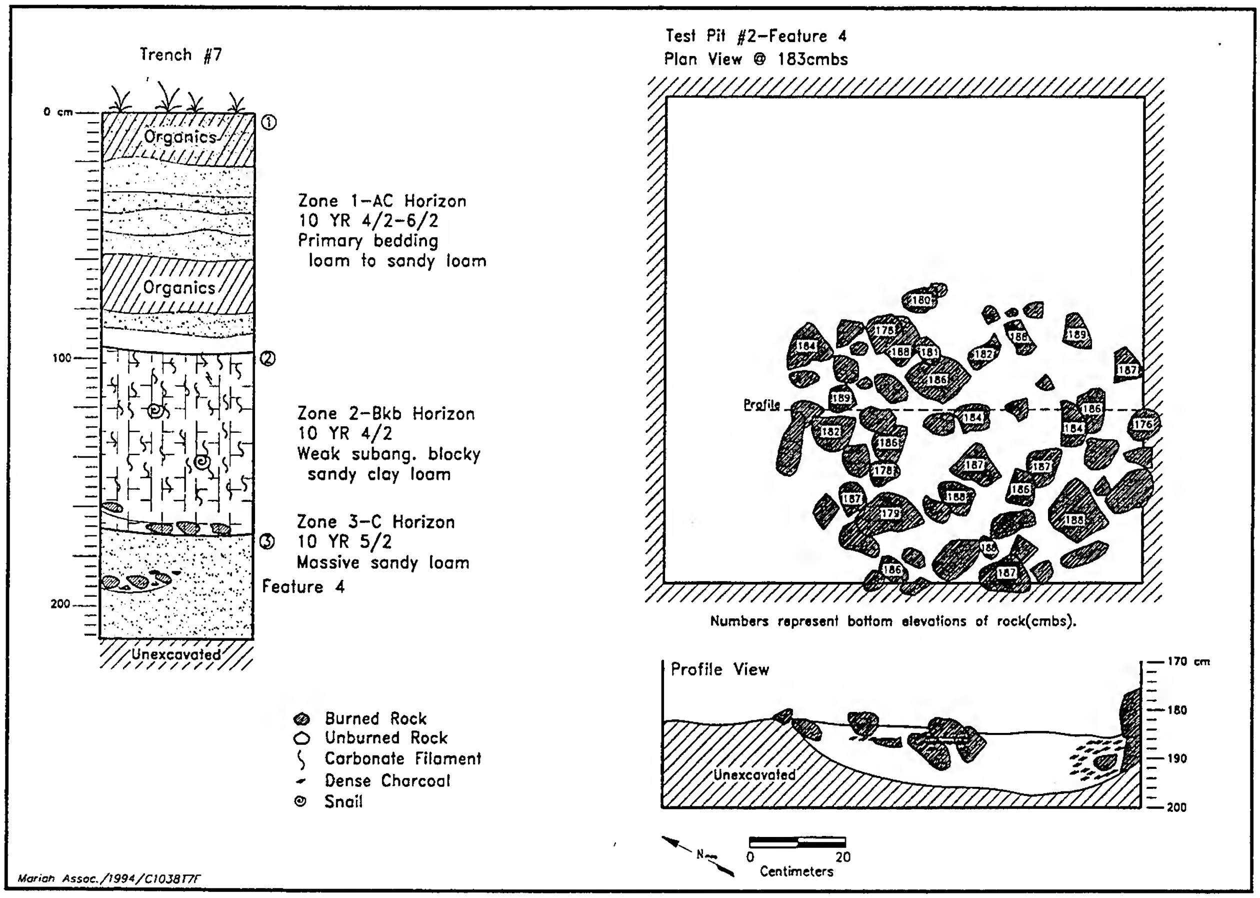

Figure 6.100 Measured Section, BT 7, and Plan of F 4 (183 cmbs), TP 2, 41CV1038.

in greater than expected frequency, Fort Hood Yellow occurred in expected frequency, and the remainder of identified types occurred in less than expected frequencies. When the indeterminates were excluded, Fort Hood Yellow occurred in greater than expected frequency and the remainder of identified types occurred in expected frequencies (Table 6.139).

The most strongly represented chert province is North Fort, with two types comprising 55% of the identified total. The Cowhouse and Southeast Range provinces are represented by three types (28%) and one type (14%), respectively. The flakes range in size from less than 0.5 cm to 5.2 cm, with the majority (77%) between 0.5 and 1.8 cm in size. Roughly 73% are completely decortified, while 3% are primary decortification flakes (Table 6.140). Once again, while the majority are indeterminate, flakes with obviously abraded cortex are far more common than obviously unabraded specimens, suggesting significant procurement from adjacent alluvial channels was practiced.

A moderately sized faunal assemblage, dominated by unidentified deer-sized mammal remains but also including bison, cottontail, and bird elements, was recovered from AU 2. A moderate number of mussel shells, representing a minimum of four distinct species (including *Potamilus purpuratus*, which was recovered from only one other site) was also recovered (Table 6.141).

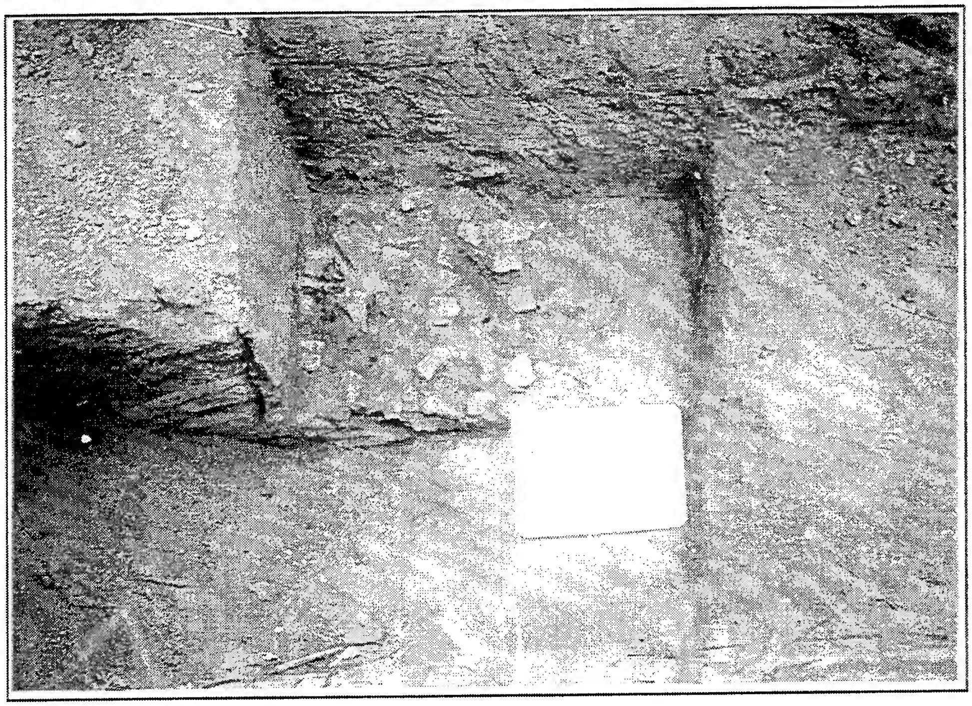

Figure 6.101 Feature 4, 41CV1038, Looking Northeast.

Table 6.137 Lithic Tools, AU 2, 41CV1038.

	Core Type	Tool Type								
Lithic Material	multiple platform	drill	end scraper	graver	late stage biface	preform	side scraper	uniface	utilized flake	Total
06-HL Tan	0	0	0	0	0	0	0	2	0	2
18-C Mottled	1	0	0	0	0	0	0	0	1	2
19-C Dr Gray	0	1	0	0	0	0	0	0	0	1
22-C Mott/Flecks	0	0	0	0	0	0	1	0	0	1
Indet Dk Brown	0	0	0	1	0	0	0	0	0	1
Indet Lt Gray	0	0	1	0	0	1	0	0	0	2
Indet Mottled	0	0	0	0	1	0	0	0	0	1
Total	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**1**	**10**

6.15.3 Conclusion and Recommendations

A minimum of three, and possibly four, alluvial fills are present within the site boundary. The most recent fill (equivalent to the Ford alluvium of Nordt 1992) underlies the complex T_0 surface, and also drapes over portions of the T_{1B} surface. This fill was well exposed in the cutbanks of Cowhouse Creek and the unnamed tributary, and consisted of strongly stratified sands and silts. No cultural material was noted in the cutbanks, but several discrete burned rock features were detected in BT 6 and BT 7. The principal fill underlying the T_{1B} surface consists of grayish brown silts and loams that are probably equivalent to the upper West Range (Nordt 1992). A mantle of this fill also covers portions of the higher T_{1A} surface. The body of this fill appears to be composed of dark grayish brown clay loam to silty clay loam that grades out to loamy fine sand near the Cowhouse Creek channel. The fine-grained fill is equivalent to the lower West Range (Nordt 1992); it is currently unclear whether the sandy, sterile channel-proximal deposits represent the lower or upper West Range. At least five distinct cultural strata were detected in the West Range fill in BT 2. Finally, a dark grayish brown silty loam was detected at depth in BT 1 and BT 2. It is unclear whether this sediment represents a facies variation of the West Range or the older Fort Hood fill, although the former is considered more likely.

Abundant archeological materials and features indicate repetitive occupation of the site. These occupations may provide an episodic record of habitation from the Middle Archaic through Late Prehistoric period. The presence of abundant charred materials and bone imply rapid burial (Ferring 1986). The evidence of burned rock features suggests that this site contains a wealth of archeological information relevant to technological issues outlined in Ellis (1994a) that are virtually ideal for applications of the research structure delineated in Ellis (1994b). Although portions of burned rock Fs 1 and 2 have been hopelessly destroyed by vehicle traffic, relatively large intact portions remain that can be integrated into research at other portions of the site (cf. Collins 1991). The close proximity of numerous hearth features to F 1 suggests that it may be realistic to expect that

Table 6.138 Debitage Recovery by Size and Material Type, AU 2, 41CV1038.

	Size (cm)						
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types							
06-HL Tan	0	0	0	2	1	1	4
08-FH Yellow	0	4	1	5	2	1	13
14-FH Gray	0	0	0	1	0	2	3
17-Owl Crk Black	0	0	0	1	0	0	1
19-C Dr Gray	0	0	1	1	2	0	4
21-C Lgt Gray	0	0	0	2	0	1	3
23-C Mott/Banded	0	0	0	1	0	0	1
Subtotal	*0*	*4*	*2*	*13*	*5*	*5*	*29*
Unidentified Types							
Indet Dk Brown	0	5	2	0	0	0	7
Indet Dk Gray	0	1	0	0	0	0	1
Indet Lt Brown	1	22	19	11	9	5	67
Indet Lt Gray	0	1	0	3	0	0	4
Indet White	0	0	0	1	0	0	1
Subtotal	*1*	*29*	*21*	*15*	*9*	*5*	*80*
Total	**1**	**33**	**23**	**28**	**14**	**10**	**109**

Table 6.139 Binomial Statistic Results, AU 2, 41CV1038.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
06-HL Tan	4	7	20	less	1	8	expected
08-FH Yellow	13	7	20	expected	1	8	more
14-FH Gray	3	7	20	less	1	8	expected
17-Owl Crk Black	1	7	20	less	1	8	expected
19-C Dr Gray	4	7	20	less	1	8	expected
21-C Lgt Gray	3	7	20	less	1	8	expected
23-C Mott/Banded	1	7	20	less	1	8	expected
Total Indet	80	7	20	more	na	na	na

functional relationships between hearths and middens can be explored in detail at this site. Given the presence of well-preserved faunal and charred botanical materials, it also is realistic to expect that the site can provide a solid data base for exploring the uses of burned rock technologies.

On this basis, site 41CV1038 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because most known eligible components are relatively deeply buried, they are fairly well protected from training and other activities that affect only the surface of the site. However, adverse impacts from traffic (as evidenced by damage to Fs 1 and 2) still pose a substantial threat. Furthermore, although the site does not appear to have been exposed to vandalism by artifact collectors, the presence of midden deposits along a well-traveled trail imply that the potential for such damage is fairly high. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, (2) prevent mechanical or manual excavations by military personnel, and (3) minimize the impact of traffic.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 180 m^2 in area. Known, relatively dense assemblages and features occur at varying depths at the site in strata ranging from about 30 cm thick to more than 100 cm thick. In some areas, occupations are separated by effectively sterile deposits. Assuming manual excavation of deposits with an average thickness of 0.75 m and careful mechanical excavation of intervening sterile deposits, approximate mitigation volume should equal about 135 m^2. In the event that mitigation is necessary, additional subsurface prospection should be performed. Such prospection could add an unknown volume to the foregoing estimate.

41CV1038 is a remarkable archeological resource. As such, mitigation efforts at a larger scale than estimated above may well yield extraordinarily robust data bases which contribute substantial, rather than incremental, advances to our knowledge of Fort Hood prehistory. The above estimated mitigation volume should therefore be regarded as a minimum relative to the site's capacity to yield valuable information. We therefore also recommend that any eventual mitigation at this site

Table 6.140 Debitage Cortex Characteristics by Material Type, AU 2, 41CV1038.

	All Cortex	Partial Cortex				
Lithic Material	Abraded	Abraded	Unabraded	Indeterminate	No Cortex	Total
Identified Types						
06-HL Tan	0	0	0	0	4	4
08-FH Yellow	1	0	0	1	11	13
14-FH Gray	1	0	0	1	1	3
17-Owl Crk Black	0	0	0	0	1	1
19-C Dr Gray	0	0	0	2	2	4
21-C Lgt Gray	0	0	0	1	2	3
23-C Mott/Banded	0	0	0	1	0	1
Subtotal	*2*	*0*	*0*	*6*	*21*	*29*
Unidentified Types						
Indet Dk Brown	0	0	0	1	6	7
Indet Dk Gray	0	0	0	0	1	1
Indet Lt Brown	1	5	2	12	47	67
Indet Lt Gray	0	0	0	0	4	4
Indet White	0	0	0	0	1	1
Subtotal	*1*	*5*	*2*	*13*	*59*	*80*
Total	**3**	**5**	**2**	**19**	**80**	**109**

Table 6.141 Faunal Recovery, AU 2, 41CV1038.

	Element											
Vertebrates	Coracoid	Femur	Fused 3&4th carpal	Indeterminate	Mandible	Metapodial	Permanent tooth	Rib	Vertebra	left	right	Total
Artiodactyla	0	1	0	0	1	1	0	0	0	0	0	3
Aves	1	0	0	0	0	0	0	0	0	0	0	1
Bos/Bison	0	1	1	0	0	0	0	0	0	0	0	2
Mammalia	0	0	0	2	0	0	0	0	0	0	0	2
Mammalia (lg/vlg)	0	0	0	2	0	0	0	0	0	0	0	2
Mammalia (med/lg)	0	1	0	96	0	0	0	0	0	0	0	97
Mammalia (very lg)	0	0	0	0	0	0	0	2	3	0	0	5
Sylvilagus sp.	0	0	0	0	1	0	1	0	0	0	0	2
Vertebrata	0	0	0	78	0	0	0	0	0	0	0	78
Total	**1**	**3**	**1**	**178**	**2**	**1**	**1**	**2**	**3**	**0**	**0**	**192**
Bivalves												
Lampsilinae	0	0	0	0	0	0	0	0	0	1	1	2
Lampsilis hydiana	0	0	0	0	0	0	0	0	0	1	1	2
Potamilus purpuratus	0	0	0	0	0	0	0	0	0	1	0	1
Quadrula houstonensis	0	0	0	0	0	0	0	0	0	1	0	1
Toxolasma texasensis	0	0	0	0	0	0	0	0	0	3	0	3
Unionacea	0	0	0	0	0	0	0	0	0	4	0	4
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**11**	**2**	**13**

involve more excavation than the above estimate, and that it be pursued with the intent to acquire data sets that will become the basis for subsequent research at other sites on Fort Hood.

6.16 SITE 41CV1085

6.16.1 Introduction

In September 1993, Mariah conducted test excavations at site 41CV1085. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.16.1.1 Location and Description

41CV1085 is a prehistoric rock shelter located in the Shell Mountain site group (Figure 6.102). The shelter is situated at the head of an intermittent drainage and measures approximately 15 m north to south and 6 m deep, with a dripline 2.5 m from the back of the shelter (Figure 6.103). The shelter itself contains no surface vegetation, but the steep talus slope below the site has moderate coverage of hardwood and juniper with an understory of greenbriar and poison ivy. The shelter is apparently intact.

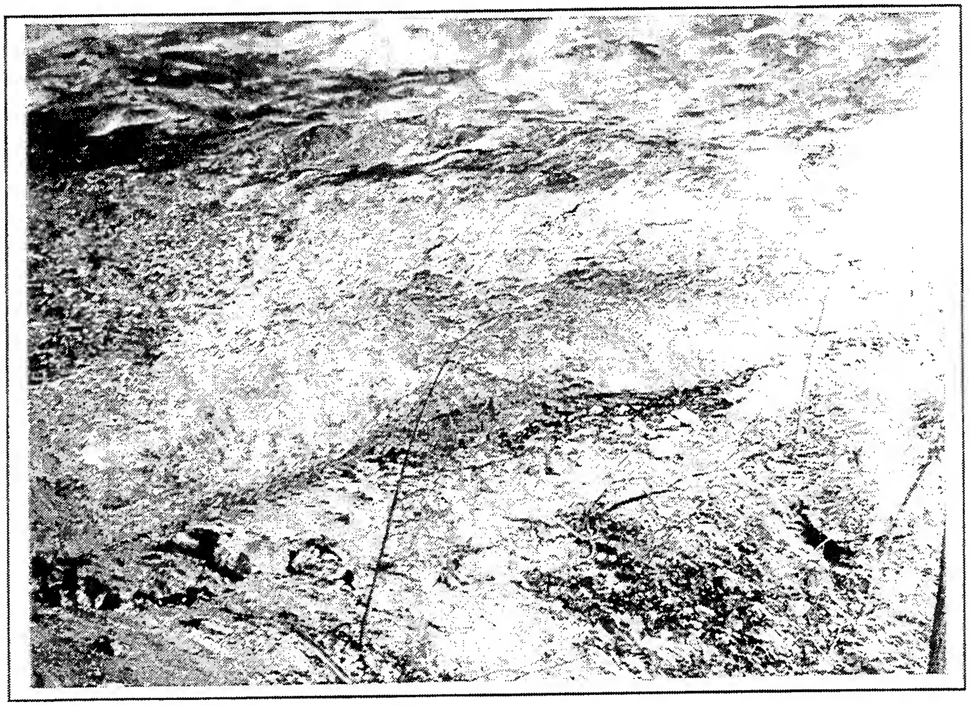

Figure 6.102 Interior of Shelter at Site 41CV1085.

6.16.1.2 Previous Work

The site was first recorded by Turpin in 1985 as an undisturbed rockshelter with a single flake observed on the surface. The depth of the deposits were estimated at 20 cm.

The site was revisited by Quigg and Frederick on 5 February 1992. Archeological and geomorphological assessments were performed, and the site map was modified. Because the shelter appeared intact and the potential for buried cultural deposits was high, a shovel test crew returned to the site on 16 April 1992 and excavated a 50 x 50 cm unit near the back wall of the shelter. The unit was excavated to 55 cmbs, where decaying limestone rooffall was encountered. A flake was found in each of the first two levels of the unit. In addition, burned rock was noticed eroding from the south part of the dripline area, suggesting the possible presence of a hearth feature. Because of the uncertain potential for buried cultural material and features, the site's eligibility for inclusion in

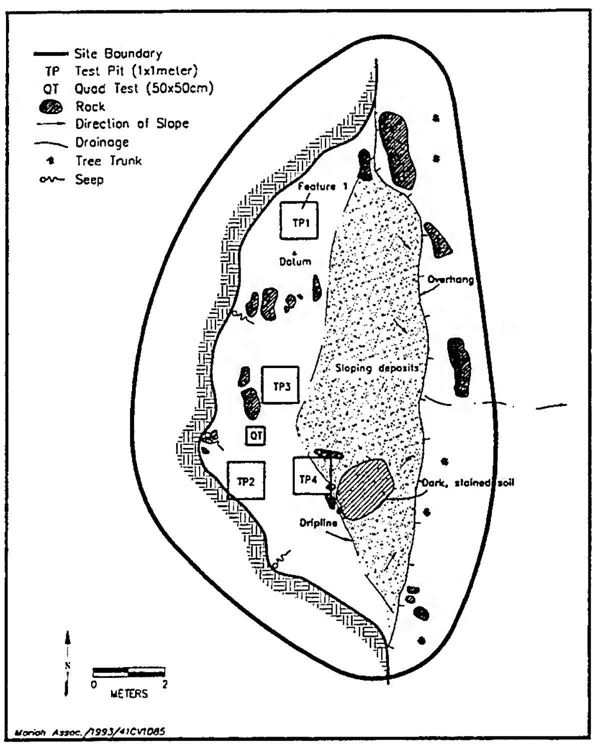

Figure 6.103 Site Map of 41CV1085.

the NRHP was uncertain. The site was recommended for avoidance or formal testing if avoidance was not possible. Recommendations for formal testing included three to four 1 x 1 m manually excavated units (Trierweiler 1994:A1212-A1213).

6.16.1.3 New Work

Four manually excavated 1 x 1 m units (TPs 1 through 4) were placed in the shelter, for a total volume of 3.3 m^2 (Table 6.142). Test pit 1 was placed on the northern end of the shelter, between the back wall and the dripline, and excavated to 60 cmbs. Test pit 2 was placed along the back wall in the southern third of the shelter where a seep area was located, and excavated to 50 cmbs. Test pit 3 was placed between TP 1 and TP 2 on the dry upslope side of the dripline and excavated to 90 cmbs. Test pit 4 was placed 40 cm downslope of TP 2 (where burned rock was observed during the shovel test phase) and was excavated to 120 cmbs. Each unit was excavated until encountering bedrock, or as in the case with TP 2, encountering a water seep that precluded further excavation. Recovered cultural material is summarized in Table 6.143.

Table 6.142 List of Treatment Units, 41CV1085.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	TP 1	1.0	1.0	60
1	TP 2	1.0	1.0	46
1	TP 3	1.0	1.0	93
1	TP 4	1.0	1.0	118

6.16.2 Results

Test pits 1 and 3 were placed in dry deposits in the shelter, and revealed profiles composed of grayish

Table 6.143 Artifact Recovery by Test Pit, 41CV1085.

	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	15	1	0(0)	0	0	14	0	3(0.1)	0	0	0	0	0(0)	0	0	1	0	0(0)
2	0	0	4	0	0(0)	0	0	13	1	1(0.1)	0	0	1	1	0(0)	0	0	2	0	1(0.3)
3	0	0	82	0	0(0)	0	0	8	1	0(0)	0	0	5	2	2(0.9)	0	0	20	1	2(0.6)
4	0	0	52	2	2(0.3)	0	0	0	0	0(0)	0	0	21	3	0(0)	0	0	14	0	3(1)
5	1	0	86	5	1(0.5)	0	0	0	0	0(0)	0	0	2	0	0(0)	0	0	11	0	4(1.5)
6	0	2	116	3	1(0.3)						0	0	1	0	0(0)	0	0	11	0	0(0)
7											0	0	0	0	0(0)	0	0	1	1	0(0)
8											0	0	0	0	0(0)	0	0	1	0	0(0)
9											0	0	0	0	0(0)	0	0	1	0	0(0)
10											0	0	0	0	0(0)	0	0	0	0	0(0)
11																0	0	0	0	0(0)
12																0	0	0	0	0(0)
TOTAL	1	2	355	11	4(1.1)	0	0	35	2	4(0.2)	0	0	30	6	2(0.9)	0	0	62	2	10(3.4)

brown to brown (10YR 5/2), internally derived silt (Type 1 deposits of Abbott 1994). Test pit 1 (Figure 6.104) yielded roughly 73% of the artifacts recovered from the shelter during testing. The lower four levels (20 to 60 cmbs) yielded high numbers of lithics, with a decrease from Level 3 to Level 4, and a peak in Level 6. A mussel shell fragment also was recovered from Level 5 and a piece of historic ceramic was found in Level 1. A radiocarbon age of 380 ± 70 BP (Beta b-75161) was obtained on charcoal recovered from Level 3, suggesting that a very late Prehistoric to Protohistoric occupation is represented. An 18 cm thick hearth (F 1) was encountered and partially exposed from 32 to 50 cmbs.

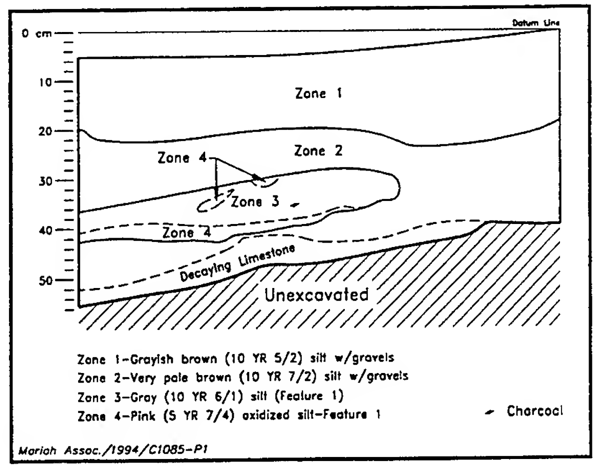

Figure 6.104 Profile of West Wall, TP 1, 41CV1085.

Feature 1 was identified by a change from a slightly dark fine matrix to a pinkish oxidized matrix (5YT 7/3) visible in planview (Figure 6.105). The feature extended beyond the west and south walls of TP 1 and appears to measure approximately 85 x 100 cm in diameter. Small areas of the pink oxidation zone are disturbed (probably by roots or rodent activity), but the majority of the feature appears to be intact. Three distinct oxidation lenses with light gray fill (probably ash) were visible in profile. The oxidized lenses are slightly U-shaped, but may represent natural surfaces rather than pits prepared for the hearth. A Perdiz arrow point, an untyped arrow point, numerous flakes, a couple of small burned rocks, and a mussel shell fragment were associated with the hearth.

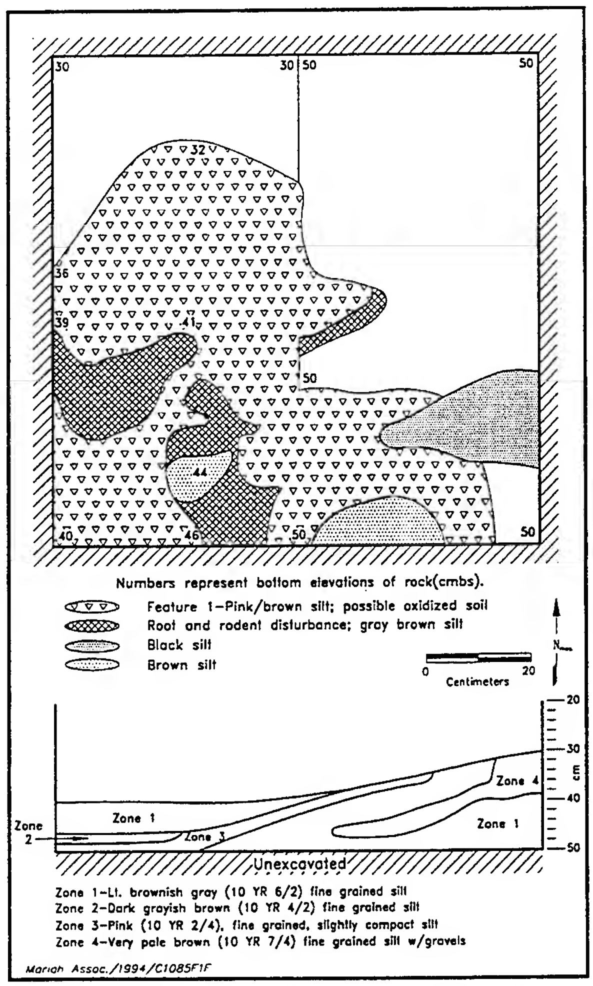

Figure 6.105 Plan View of F 1 (50 cmbs), TP 1, 41CV1085.

Below F 1, in Level 6, the fill changed to a dark grayish-brown (10YR 4/2) silt with gravels and decaying limestone. A Travis point and several flakes were found in this level, along with the only bone specimens recovered from the shelter.

Test pit 3 was placed in the center of the shelter. Although the fill was similar to TP 1, more roots were encountered in TP 3, presumably as a result of its proximity to a seep at the south end of the shelter. This test pit yielded a moderate amount of lithics from 10 to 60 cmbs, including one or two cores and relatively large core flakes. Lithic

frequencies were few at the upper level, peaked at 30 to 40 cmbs, and declined rapidly to 60 cmbs. In addition to these flakes, a few burned rocks were found from 20 to 30 cmbs. More than 100 snails were found in Level 4, which is also the level with the highest lithic count, suggesting that the principal occupation surface lies 30 to 40 cmbs. Sloping bedrock was encountered at 50 to 60 cmbs, and the unit was halted at 93 cmbs when bedrock was encountered across the entire base of the unit.

Test pits 2 and 4 were placed in moist deposits near a seep on the south end of the shelter. Test pit 2 (Figure 6.106) was placed just in front of the back wall of the shelter, where a buried pipe appeared to be sloping back under the wall. Moderate amounts of flakes were recovered in the upper 30 cm of the test pit and a single burned rock an an untyped arrow point were found from 10 to 20 cmbs. A large rooffall slab (covering approximately the northeastern half of the unit) was encountered in Level 3. While trying to excavate around the slab, an active seep began filling the unit with water. The unit was halted at 50 cmbs, and Levels 4 and 5 were culturally sterile. Judging from the light color of the sediment at the base of the unit, decaying bedrock was probably only 10 to 20 cm deeper.

Test pit 4 was placed in moist fill, approximately 40 cm from TP 2, over the area where burned rocks were reported on the surface during shovel testing. The surface of the unit sloped at least 45°, causing the volume of the first several levels to be less than 0.1 m^2 each. The upper two levels contained a few flakes and a burned rock. The following level contained the highest frequency of cultural material found in the test pit, with several flakes and mussel shells and a couple of burned rocks found, therein. Levels 4 through 6 each yielded less than half the number of flakes found in Level 3. In addition to the flakes, a few burned rocks were found in Levels 4 and 5. Artifact frequencies decreased dramatically in Levels 6 through 9. Only a few flakes were found in these levels. Several large core fragments and core

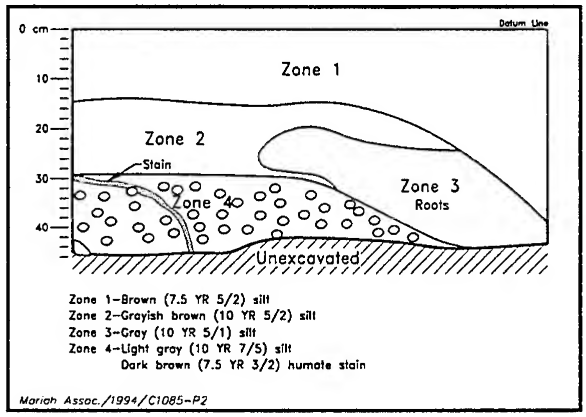

Figure 6.106 Profile of West Wall, TP 2, 41CV1085.

flakes were found from 20 to 40 cmbs, and the unit appears to have more tertiary and thinning flakes than the other three units. Bedrock covered the entire test pit floor at 118 cmbs.

Four projectile points, including a Travis dart point, a Perdiz and two untyped arrow points were recovered from the site. One of the untyped arrow points was manufactured from Fort Hood Yellow, while the other three points were composed of indeterminate cherts (Table 6.144). The tool assemblage consists of 17 specimens including a drill and various bifacial and unifacially modified artifacts (Table 6.145). Of note, eight of these tools (47%), including the drill, are made of Heiner Lake Tan chert, which represents the relatively distant (25+ km) Southeast Range province. Four others (24%) are manufactured from North Fort cherts (Fort Hood Yellow and Gray/Brown/Green), while the remainder represent various indeterminate varieties.

A moderately large debitage assemblage, consisting of ten identified chert types and eight indeterminate chert varieties, was recovered from the shelter excavations (Table 6.146). Roughly 38% of the assemblage was identified. The identified fraction was overwhelmingly dominated by Fort Hood Yellow. When the entire assemblage was considered, only the aggregate indeterminates and Fort Hood Yellow occurred in greater than

expected frequency, while the remainder of identified types occurred in less than expected frequency (Table 6.147). Not surprisingly, given that Fort Hood Yellow comprised roughly 91% of the identified fraction, exclusion of the indeterminates produced the same statistical results. More surprising is the very poor correspondence between the projectile points and tools, which are dominated by Heiner Lake Tan, and the Fort Hood Yellow dominance evident in the debitage.

Although 64% of the assemblage was between 0.5 and 1.2 cm in size, a wide range of sizes are represented in the assemblage, suggesting that a full range of reduction stages is represented (Table 6.148). No primary cortical flakes are present, but roughly 10% of the assemblage does bear some cortex. These flakes are evenly divided between abraded and unabraded cortical surfaces, suggesting that both stream procurement and upland procurement was practiced (Table 6.148).

Faunal recovery was very limited. Only two indeterminate bone fragments and one mussel shell (*Quadrula* sp.) were recovered from all of the testing phase excavations.

6.16.3 Conclusion and Recommendations

The site is a rockshelter that contains both wet and dry sediments. Projectile points imply a Late Prehistoric to Protohistoric occupation, as does the one available radiocarbon age. The presence of a dart point in the lower elevations of TP 1 may imply an Archaic occupation, but it is also possible that the dart point reflects collection and reuse by Late Prehistoric occupants. Although a historic artifact was recovered from the top level of TP 1, the shelter appears to be largely intact. Indeed, the integrity of F 1 (below the historic ceramic) implies that vertical disturbance is minimal, and internal stratification of the feature implies that it may be possible to isolate individual occupations in at least the north end of the shelter.

Both TPs 2 and 4 contained darker brown to gray-brown matrices (Type 3 sediments of Abbott 1994) than TPs 1 and 3 (which exhibited Type 1 sediments). The processes by which these sedimentary differences might have arisen are poorly understood for rockshelters in Central

Table 6.144 Projectile Points, AU 1, 41CV1085.

	Lithic Material				
Point Type	08-FH Yellow	Indet Dk Brown	Indet Lt Brown	Indet Misc.	Total
Other Arrow	1	0	0	1	2
Perdiz	0	0	1	0	1
Travis	0	1	0	0	1
Total	**1**	**1**	**1**	**1**	**4**

Table 6.145 Nonprojectile Point Lithic Tools, AU 1, 41CV1085.

	Tool Type						
Lithic Material	drill	late stage biface	middle stage biface	preform	uniface	utilized flake	Total
06-HL Tan	1	0	0	0	1	6	8
08-FH Yellow	0	0	1	0	0	2	3
15-Gry/Brn/Grn	0	1	0	0	0	0	1
Indet Dk Brown	0	1	0	0	0	0	1
Indet Lt Brown	0	0	0	1	0	1	2
Indet Lt Gray	0	0	0	1	0	0	1
Indet White	0	0	0	0	0	1	1
Total	**1**	**2**	**1**	**2**	**1**	**10**	**17**

Texas, although these differences are certainly related to the influence of the seep in the south end of the shelter. This shelter therefore has substantial potential to provide important data on the largely unknown processes of site formation and transformation that affect Central Texas rockshelters. These data also are likely to be useful for addressing paleoenvironmental issues.

The distribution of lithic artifacts for the shelter indicates that cultural material was located in most levels in the shelter. More than 340 artifacts were recovered from the shelter. Lithics comprised the majority of pieces (91%), with bone (1%), mussel shell (3%), and burned rock (5%) occurring in much smaller amounts. Over 234 snails (mainly *Rabdotus* sp.) were recovered. Interestingly, the snail count varies fairly directly with the lithic count, with increases or decreases in one frequently accompanied by increases or decreases in the other. This suggests that the snails are probably associated with occupation strata, a phenomenon that is also common at other sites on base. Cultural materials in the shelter are abundant and should provide a significant data base for pursuing technological studies outlined in the research domains defined in the research design for Fort Hood (Ellis 1994b).

Table 6.146 Debitage Recovery by Size and Material Type, AU 1, 41CV1085.

	Size (cm)							
Lithic Material	<.05	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	Total
Identified Types								
02-C White	0	0	0	1	0	0	0	1
03-AM Gray	0	0	0	0	1	0	0	1
06-HL Tan	0	0	0	0	1	0	1	2
08-FH Yellow	0	43	54	20	32	16	0	165
09-HL Tr Brown	0	0	0	1	0	0	0	1
13-ER Flecked	0	0	0	0	1	0	0	1
15-Gry/Brn/Grn	0	0	1	0	1	2	0	4
18-C Mottled	0	0	1	1	0	2	0	4
21-C Lgt Gray	0	0	0	0	1	0	0	1
28-Table Rock Flat	0	0	0	1	0	0	0	1
Subtotal	*0*	*43*	*56*	*24*	*37*	*20*	*1*	*181*
Unidentified Types								
Indet Dk Brown	0	4	7	5	1	0	0	17
Indet Dk Gray	0	1	1	0	3	1	0	6
Indet Lt Brown	11	47	37	15	4	0	0	114
Indet Lt Gray	0	27	8	10	3	0	0	48
Indet Misc.	4	21	54	22	2	2	0	105
Indet Mottled	0	0	1	4	1	0	0	6
Indet Trans	0	0	0	1	0	1	0	2
Indet White	0	0	2	0	1	0	0	3
Subtotal	*15*	*100*	*110*	*57*	*15*	*4*	*0*	*301*
Total	**15**	**143**	**166**	**81**	**52**	**24**	**1**	**482**

Table 6.147 Binomial Statistic Results, AU 1, 41CV1085.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	1	31	56	less	10	26	less
03-AM Gray	1	31	56	less	10	26	less
06-HL Tan	2	31	56	less	10	26	less
08-FH Yellow	165	31	56	more	10	26	more
09-HL Tr Brown	1	31	56	less	10	26	less
13-ER Flecked	1	31	56	less	10	26	less
15-Gry/Brn/Grn	4	31	56	less	10	26	less
18-C Mottled	4	31	56	less	10	26	less
21-C Lgt Gray	1	31	56	less	10	26	less
28-Table Rock Flat	1	31	56	less	10	26	less
Total Indet	301	31	56	more	na	na	na

On this basis, site 41CV1085 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the known eligible components are located in a setting that is frequently sought by artifact collectors, the site is vulnerable to vandalism. Because the cultural materials are shallowly buried, they also are vulnerable to unintentional damage by personnel using the shelter during training exercises. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, and (2) prevent surface disturbance and manual excavations by military personnel.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1993.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 60 m^2 in area. Mitigation efforts should be extended to surfaces outside the overhang of the shelter in order to acquire data that may remain beneath major rooffall events. Because cultural materials occur to depths of 100 cmbs, the volume of total mitigation may reach 60 m^2 of manual excavation.

6.17 SITE 41CV1097

6.17.1 Introduction

In late February and early March 1994, Mariah conducted test excavations at site 41CV1097. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

Table 6.148 Debitage Cortex Characteristics by Material Type, AU 1, 41CV1085.

	Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types						
02-C White	0	0	0	1	0	1
03-AM Gray	0	0	0	1	0	1
06-HL Tan	0	0	1	1	0	2
08-FH Yellow	6	7	3	149	0	165
09-HL Tr Brown	0	0	0	1	0	1
13-ER Flecked	0	0	0	1	0	1
15-Gry/Brn/Grn	0	0	0	4	0	4
18-C Mottled	1	0	0	3	0	4
21-C Lgt Gray	1	0	0	0	0	1
28-Table Rock Flat	0	0	0	1	0	1
Subtotal	*8*	*7*	*4*	*162*	*0*	*181*
Unidentified Types						
Indet Dk Brown	0	0	1	16	0	17
Indet Dk Gray	1	0	0	5	0	6
Indet Lt Brown	1	1	10	102	0	114
Indet Lt Gray	0	3	0	45	0	48
Indet Misc.	1	2	4	98	0	105
Indet Mottled	3	1	1	0	1	6
Indet Trans	0	0	1	1	0	2
Indet White	0	0	0	3	0	3
Subtotal	*6*	*7*	*17*	*270*	*1*	*301*
Total	**14**	**14**	**21**	**432**	**1**	**482**

6.17.1.1 Location and Description

Site 41CV1097 is situated on the T_1 terrace on the south side of Cowhouse Creek in an area experiencing active gullying (Figures 6.107 and 6.108). Maximum site dimensions are 40 x 30 m (about 1,200 m^2, or 0.3 acres). For purposes of this report, the site is considered a member of the West Cowhouse site group.

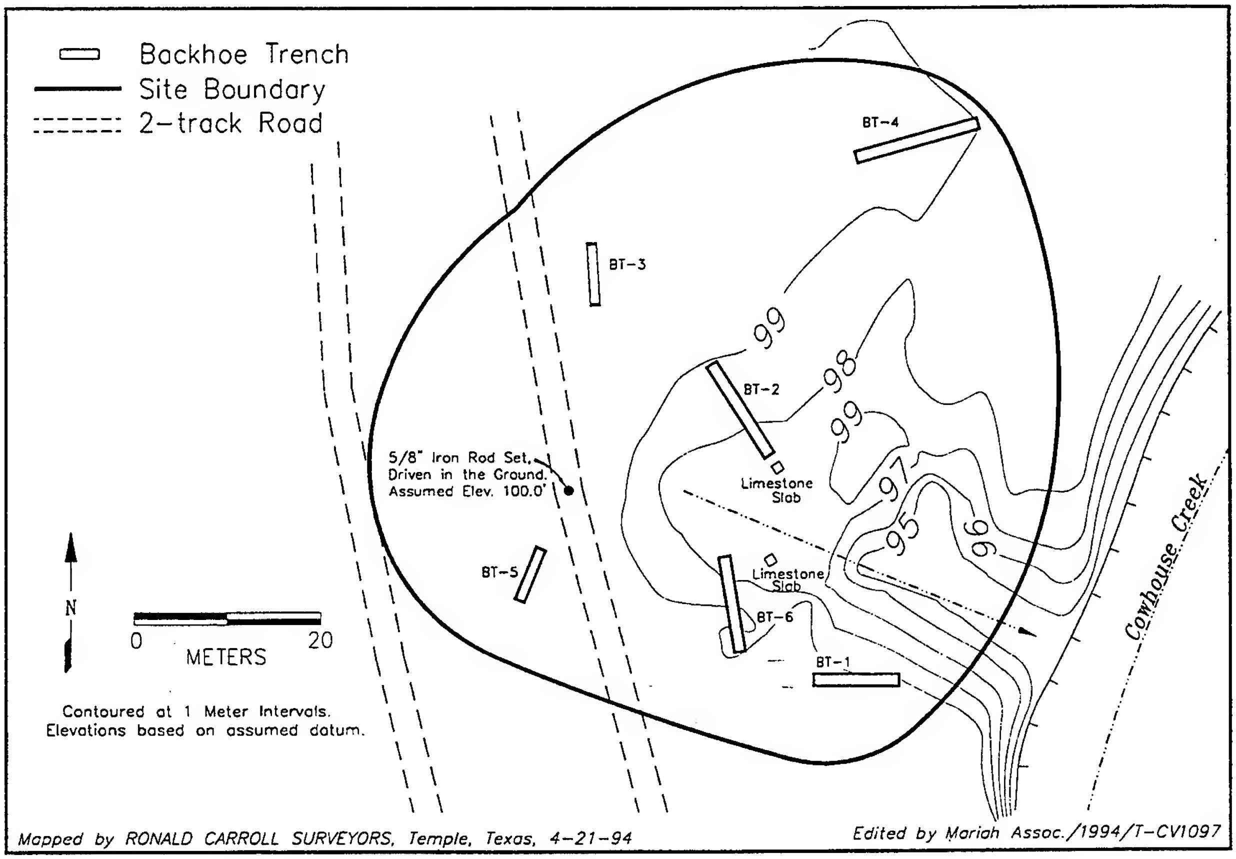

Figure 6.107 Site Map of 41CV1097.

Figure 6.108 Overview of Site 41CV1097, Looking East.

6.17.1.2 Previous Work

This site was recorded by Turpin on 16 July 1985. Limited amounts of lithic debitage, burned rock, and mussel shell were observed approximately 1 to 2 m below surface (mbs) in an eroding gully and in a cutbank adjacent to Cowhouse Creek. The site was estimated to be 70% disturbed by erosion. The area of the site was estimated to be 40 m x 30 m, but considering the buried nature of the site and the limited exposure, the actual site size was considered unknown.

Frederick and Quigg revisited the site in January 1992 and reevaluated the site based on archeological and geomorphic observations. The site matrix was interpreted as Fort Hood alluvium (Nordt 1992) fronted by a narrow inset wedge of Ford alluvium. Minimal quantities of cultural material were observed in eroded areas between approximately 1.5 and 2 mbs. No surficial archeological materials were observed. However, surface visibility was severely restricted by a recent flood drape. Because the depth of previously reported cultural material exceeded the maximum depth of shovel tests, and the depth of potentially intact cultural material far exceeded this depth, no manual tests were excavated. For this reason, the possibility that buried cultural material was present remained high, and the archeological potential of the site was therefore uncertain. The site was recommended for avoidance or for formal eligibility testing if avoidance was not possible. A minimum of three backhoe trenches was recommended to determine NRHP eligibility (Trierweiler 1994:A1223-A1224).

6.17.1.3 New Work

Three trenches (BTs 1 through 3) were excavated on the site to examine internal stratigraphy and to prospect for buried cultural deposits. Trench 1 was placed on the T_1 surface, BT 2 was placed on the beveled margin of a headward-cutting gully, and BT 3 was placed on the level terrace tread behind BT 2. Three additional trenches were excavated to insure that the level of subsurface prospection was adequate, but only the three initial trenches were examined and described by the geomorphologist (Table 6.149). All of the trench walls were manually scraped with trowels and inspected for buried cultural material.

6.17.2 Results

Trench 1 was situated near the Cowhouse Creek cutbank on the T_1 terrace. It exhibited an A-AB-Bw-Bk-C profile developed in fine sandy to silty loam. Color varied from very dark gray (10YR 3/1) to grayish brown (10YR 5/2) with depth. The A horizon exhibited a very weak granular structure, and the Bw horizon exhibited a very weak subangular blocky structure that increased to a moderate, medium subangular blocky structure in the upper Bk horizon. The AB, lower Bk, and C horizons were massive. Carbonate development was limited to moderately developed films and filaments. The exposure is tentatively interpreted as the West Range alluvium of Nordt (1992). No cultural material was detected in the trench.

Trench 2 was situated on a bevel in the terrace surface formed by the headward-cutting gully. It was situated to investigate the only area where cultural material was noted on the surface (very sparse burned rock and mussel shell), and represented an area where up to 2 m of the upper fill had been truncated. The trench revealed a C1-

Table 6.149 List of Treatment Units, 41CV1097.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cm)
1	BT 1	11	0.8	370
1	BT 2	9	0.8	370
1	BT 3	12	0.8	330
1	BT 4	10	0.8	340
1	BT 5	8	0.8	300
1	BT 6	10	0.8	350

C2-C3 profile. Zone 1 was approximately 2 m thick and consisted of massive, brown (10YR 4/3) sandy loam cut with several thin gravel stringers. Zone 2 was approximately 80 cm thick and consisted of massive, brown (10YR 4/3) sandy clay loam. Zone 3 consisted of at least 40 cm of bedded, clast-supported channel gravels. No cultural material was observed within the trench.

A third trench (BT 3) was excavated on the level terrace surface behind BT 2 to prospect for cultural material. Like BT 2, it consisted of loamy sediments that exhibited a brown color clearly different from the grayish brown sediments exposed by BT 1. Therefore, BT 2 and BT 3 appear to represent an older fill than that exposed in BT 1, and are tentatively interpreted as the Fort Hood fill of Nordt (1992). No cultural material was observed in the trench.

The remaining trenches were not examined by the geomorphologist and therefore cannot be confidently correlated with either of the two identified fills on site, but all exposed thick, loamy Holocene sediments and were devoid of cultural material. Trench 6 was excavated in the eroded area at the southern part of the site. Trench 4 was excavated along the northern site boundary. Trench 5 was excavated at the western site boundary. No cultural material was observed in any of the trenches either during excavation or after careful inspection of the trench walls.

6.17.3 Conclusions and Recommendations

Trench 1 was situated closer to the Cowhouse cutbank than the other trenches described by the geomorphologist, and exhibited a fill that was significantly grayer in color than the fill exposed in BT 2 and BT 3. For this reason, it is tentatively interpreted as the late Holocene West Range alluvium, while BT 2 and BT 3 are tentatively interpreted as the older Fort Hood fill. No stratified cultural material was detected in any of the trenches, suggesting that any occupational debris contained in the site matrix is very ephemeral and may have already been destroyed by gullying of the T_1 terrace. As a result, the site has poor potential to provided data for addressing research issues outlined in the research design for Fort Hood (Ellis et al. 1994). On the basis of the above, we judge 41CV1097 to be ineligible for inclusion in the NRHP. No further work is recommended for this site.

6.18 SITE 41CV1098

6.18.1 Introduction

In late August 1993, Mariah conducted test excavations at site 41CV1098. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.18.1.1 Location and Description

Site 41CV1098 is a prehistoric site situated on a high alluvial terrace above Cowhouse Creek. An east-to-west oriented vehicle trail, running along the edge of Cowhouse Creek, bisects the southern third of the site (Figure 6.109). The site measures approximately 60 m east to west x 15 m north to south (about 900 m^2, or 0.2 acre) and is vegetated primarily by short grasses, with shrubs, juniper, and hardwood trees at the terrace edge (Figure 6.110). According to former local landowners, the entire alluvial terrace in this area was once cultivated, and all trees presently on the surface have grown since the establishment of Fort Hood in the early 1940s. The road that bisects the site is the major impact to the site, but historic cultivation of the site has also caused an unknown level of impact to at least the upper 20 to 30 cm of deposits. Erosion of the Cowhouse Creek terrace edge also affects the northern border of the site.

6.18.1.2 Previous Work

The site was first recorded by Strychalski and Bradle in 1985, and was described as a light scatter of lithics, tools, burned rock, and mussel shell. A

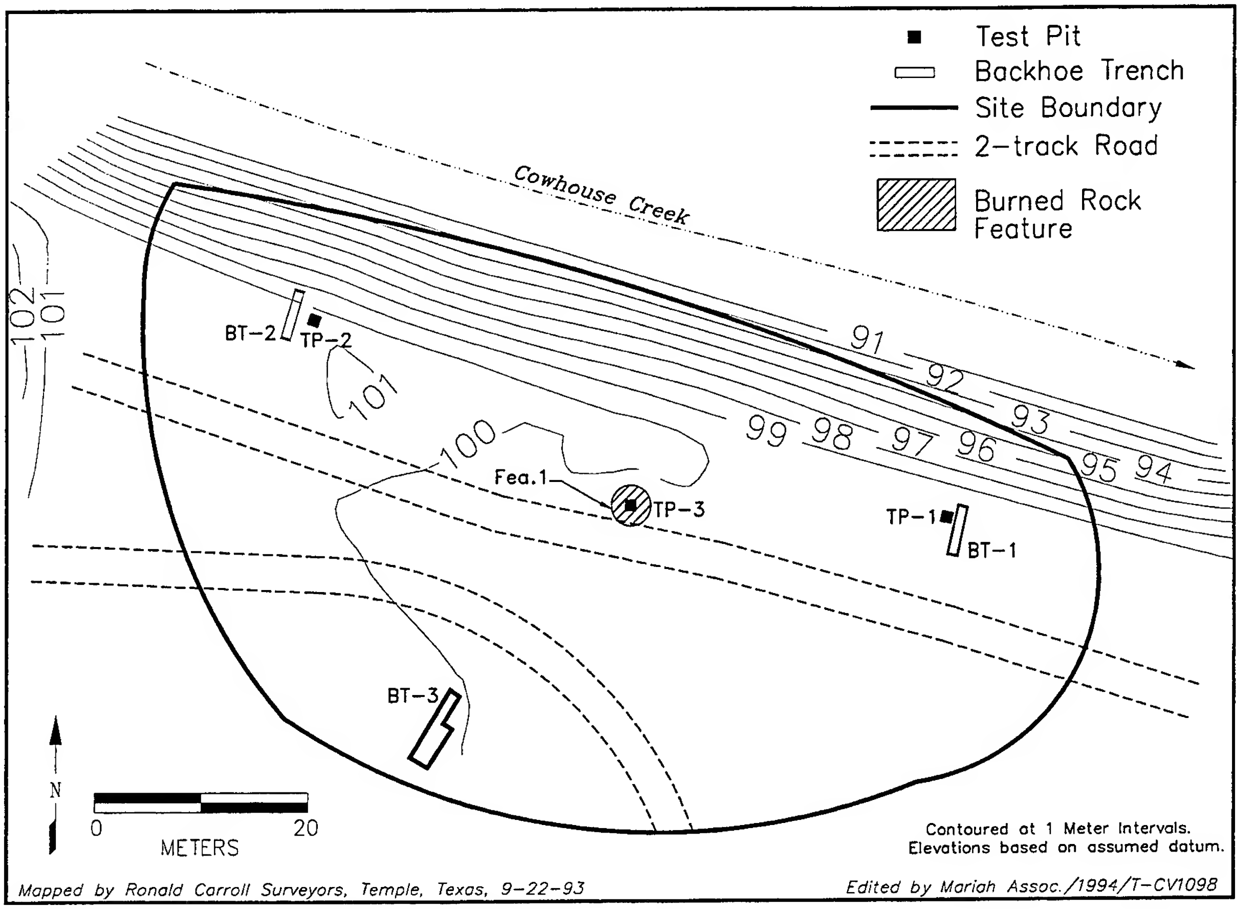

Figure 6.109 Site Map of 41CV1098.

Castroville point was collected. Most materials were exposed in the road bisecting the site, with some material exposed on the edge of the alluvial terrace.

The site was revisited by Quigg and Frederick on 14 January 1992. Archeological and geomorphological assessments indicated some potential for buried cultural material, and a shovel testing crew returned in February 1992 and excavated five shovel tests. Two of the shovel tests, one on a burned rock concentration (F 1) and the other southeast of the site boundary, yielded cultural material. However, on the basis of the shovel testing, the NRHP eligibility of the site was uncertain, and further testing was recommended. Three backhoe trenches and two to four 1 x 1 m manually excavated units were recommended to determine eligibility (Trierweiler 1994:A1225-A1226).

6.18.1.3 New Work

Three backhoe trenches (BTs 1 through 3) were excavated into the terrace surface to a depth of 3 m (Table 6.150). Trenches 1 and 2 were situated on the margin of the terrace scarp, while BT 3 was situated approximately 30 m back from the edge. Three 1 x 1 m excavation units (TP 1-3) also were excavated. Two units (TP 1 and TP 2) were placed adjacent to BT 1 and BT 2, respectively. Test pit 3 was placed on the burned rock concentration (F 1). A total of 6.6 m^2 was manually excavated. Recovered cultural material is summarized in Table 6.151.

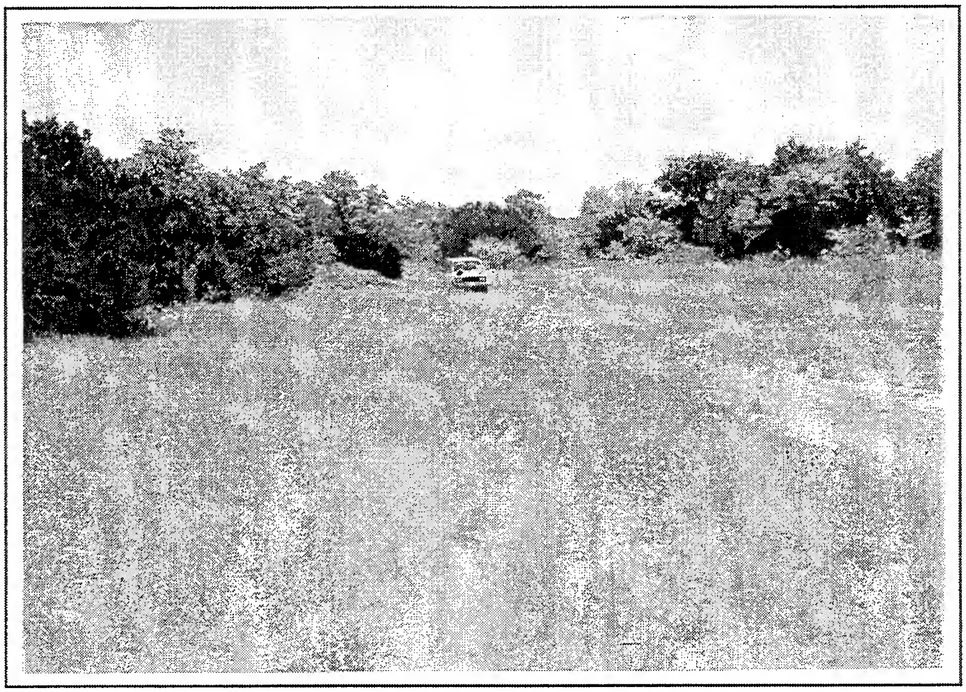

Figure 6.110 Overview of Site 41CV1098, Looking East.

6.18.2 Results

Trench 1 revealed a section composed of calcareous silty loam to clay loam cut with several thick interbeds of calcareous loamy sand. The surface A horizon consists of 30 cm of dark gray (10YR 4/1) sandy clay loam exhibiting weak coarse subangular blocky structure that grades into a thick (130 cm), dark grayish brown (10YR 4/2), sandy loam Bk horizon exhibiting a weak fine subangular blocky structure and fine carbonate filaments throughout. This horizon is underlain by a moderately thick (55 cm) C horizon composed of massive yellowish brown loamy sands. At a depth of 215 cmbs, this sand fines abruptly into a C2 horizon consisting of a thin (5 to 10 cm) drape of massive brown loamy silt (Zone 4). This thin silty drape rests unconformably on an extensive, slightly wavy, burned paleo surface (Zone 5) consisting of scattered charcoal flecks, charcoal-stained earth, and oxidized sediment. Typically, the burned zone grades rapidly from charcoal-stained grayish brown sediments to oxidized reddish orange material. In a few locations, burning of the sediment appears to have created a localized barrier to infiltrating water, resulting in the patchy precipitation of soft masses of calcium carbonate above the burn. The entire burned zone, including the stained and oxidized layers, rarely exceeds 1 cm in thickness. This zone is underlain by a Bk horizon consisting

Table 6.150 List of Treatment Units, 41CV1098.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	6	0.8	300
1	BT 2	6	0.8	280
1	BT 3	6	0.8	300
1	TP 1	1.0	1.0	300
1	TP 2	1.0	1.0	200
1	TP 3	1.0	1.0	160

Table 6.151 Artifact Recovery by Test Pit, 41CV1098.

	TEST PIT 1					TEST PIT 2					TEST PIT 3				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
2	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	1	0	0(0)
3	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	1	1	0(0)
4	0	0	0	0	0(0)	0	0	0	0	0(0)	1	0	0	0	7(2)
5	0	0	1	0	6(0.8)	0	0	0	0	0(0)	1	0	0	0	3(0.9)
6	0	0	0	0	0(0)	0	0	1	0	0(0)	0	0	0	0	0(0)
7	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
8	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
9	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
10	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
11	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
12	0	0	1	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
13	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
14	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
15	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
16	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
17	0	0	0	0	0(0)	0	0	0	0	0(0)					
18	0	0	0	0	0(0)	0	0	0	0	0(0)					
19	0	0	0	0	0(0)	0	0	0	0	0(0)					
20	0	0	0	0	0(0)										
21	0	0	0	0	0(0)										
22	0	0	0	0	0(0)										
23	0	0	0	0	0(0)										
24	0	0	0	0	0(0)										
25	0	0	0	0	0(0)										
26	0	0	0	0	0(0)										
27	0	0	0	0	0(0)										
28	0	0	0	0	0(0)										
29	0	0	0	0	0(0)										
30	0	0	0	0	0(0)										
TOTAL	0	0	2	0	6(0.8)	0	0	1	0	0(0)	2	0	2	1	10(1.1)

of massive, brown loamy silt to silty loam interspersed with thin sandy lenses that extended from 224 cmbs to the base of the trench at 300 cmbs. The zone exhibits weak coarse subangular blocky structure. Fine films of silty and fine sandy sediment are common on the faces of these large peds. The excavation of BT 1 revealed a few burned rocks in the upper 40 cm of the A horizon, and a snail lens and an area of charcoal and oxidized earth occurred at approximately 230 cmbs.

Test pit 1 was placed adjacent to BT 1 and excavated to 300 cmbs to investigate the burned

rock in the upper A horizon and the lens of oxidized earth noted at approximately 230 cmbs in the trench wall. Cultural material was very sparse within this test pit and the total items recovered included a single burned rock from 20 to 30 cmbs, a few small burned rocks (0.75 kg) from 40 to 50 cmbs, and a single flake each from 50 to 60 cmbs and 110 to 120 cmbs. The profile of TP 1 revealed nothing different from the trench profile. Although snail shell was recovered from each level excavated, two levels containing large amounts of snails (mainly *Rabdotus* sp., which occurred in numbers of over 200 per level), were encountered from 210 to 230 cmbs. From 230 to 240 cmbs, a patchy, very thin (1 cm), oxidized lens was uncovered, with some areas of the lens ranging from a very dark gray (10YR 4.1) to a light orange brown (10YR 6.4) color. No cultural material was found in association with the burned lens, which also extends into the side of BT 1, almost 1.5 m from the edge of TP 1. The oxidation lens is interpreted as the remnants of a grass fire. Notably, a similar burned anomaly was found about 800 m downstream at site 41CV1105 (see Section 6.20).

The profiles in BT 2 and BT 3 are very similar to each other, but differ from the profile exposed in BT 1. The BT 2 and BT 3 profiles are finer-grained overall and lack the intercalated sandy beds, suggesting that they represent less proximal deposits. The A horizon is typically 40 to 60 cm thick and consists of dark gray, sandy clay loam exhibiting coarse subangular blocky structure. This horizon is underlain by a brown sandy clay loam Bk (possibly very weak Btk) horizon 30 to 50 cm thick that exhibits fine subangular to angular blocky structure and a few very weak clay skins and bridges. This horizon grades into a yellowish brown, massive sandy loam to sandy clay loam Bk horizon 115 to 140 cm thick. This thick zone contains common filamental carbonate and decomposing snail shells. At a depth of 210 to 225 cm, this unit grades into a massive brown clay loam to sandy clay loam that extends to the base of the exposures at 300 cmbs. A moderate number of carbonate filaments are apparent in this horizon, which is provisionally designated a Bk horizon. No cultural material was observed in BTs 2 or 3.

Although no cultural material was observed in BT 2 during backhoe excavation, TP 2 was offset from BT 2 to determine if the subsurface material found in BT 1 extended to the west edge of the defined surface boundaries of the site. The test pit was excavated to a depth of 200 cmbs. Recovery from this test pit was extremely sparse, consisting of one mussel shell and a couple of flakes. However, the mussel shell and one of the flakes were found from 40 to 60 cmbs, which coincides with levels containing the majority of cultural material in TP 1.

Feature 1 was first identified during the 1992 geomorphic and archeological assessments, and is the only feature on the site. The feature consisted of a concentration of burned rock eroding into the vehicle road bisecting the site. Within the road, the feature measured approximately 80 cm in diameter x 5 cm thick. Test pit 3 was placed on the edge of F 1 to investigate any undisturbed deposits that might remain. The upper level of the test pit was culturally sterile. The following 2 levels contained a few flakes and a single burned rock. Feature 1 was encountered from 30 to 35 cmbs. It yielded only a small amount of burned rock (n=7, 2 kg) and a mussel shell. No staining was observed around the rocks, and no charcoal flecking was observed. The feature has been highly impacted by the road and probable cultivation the upper 30 cm of the site. A few small burned rocks (less than 1 kg) and a mussel shell were also found in the level below the feature. A mussel shell, found at 50 to 60 cmbs, was the only item recovered from the remainder of the test pit.

Only one uniface, possibly representing a knife fragment, was recovered from this site. It was manufactured from Fort Hood Yellow chert (North Fort province). Debitage consisted of one flake of Heiner Lake Tan (Southeast Range province) and four indeterminate light brown flakes. Two mussel

shells, one of which represents *Amblema* sp., were the only faunal materials recovered.

6.18.3 Conclusions and Recommendations

Overall, the deposits exposed in the backhoe trenches appear to represent the same depositional unit. Although the strata encountered in BT 1 were slightly more diverse than those detected in BTs 2 and 3, this difference appears to be a function of facies variation rather than any temporal difference. Although they are clearly of Holocene age, it is uncertain how the deposits relate to the sequence of Nordt (1992), although the most likely interpretation is that they represent the early-middle Holocene Fort Hood fill.

Materials recovered or observed during testing include snails (mostly *Rabdotus* sp.), burned rock, lithics, and mussel shell fragments. Cultural material was recovered mainly from 10 to 60 cmbs. The number of artifacts (other than snails) recovered from these levels is low (n=28). The artifact distribution implies a possible occupation from 30 to 60 cmbs, especially considering the presence of a burned rock concentration (F 1) from 30 to 50 cmbs in TP 3 and the presence of few artifacts at similar elevations in TP 1 and TP 2. However, artifact densities are so low that a possible occupation at 30 to 60 cmbs is not likely to reach artifact densities needed for an analysis of discrete hunter-gatherer occupations (cf. Ellis 1994a). Furthermore, since the area has been heavily cultivated in historic times, the stratigraphic context of the cultural material is questionable. Site 41CV1098, therefore, has low potential to provide significant data for problems delineated in the research design for Fort Hood (Ellis 1994b).

On this basis, we judge 41CV1098 to be ineligible for inclusion in the NRHP, and recommend no further management for the site. However, the presence of noncultural charcoal and landsnails, in conjunction with a deeply buried natural burning event, suggests that the site may have some potential to provide useful data if future research shows this event to have possible chronological significance as a time marker (Ellis 1994b). Stratigraphic relationships between this charcoal and abundant snail assemblages indicates the potential to provide data for incremental production and refinement of an amino acid epimerization dating curve for Fort Hood. Therefore, although we recommend no further management for the site, it is nonetheless desirable that access to the site be available in the event that the above data can fill gaps in ongoing research. This recommendation does not require protection of the site because training activities are unlikely to be detrimental to such data content.

6.19 SITE 41CV1099

6.19.1 Introduction

In late February and early March 1994, Mariah conducted test excavations at site 41CV1099. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.19.1.1 Location and Description

Site 41CV1099 is situated on T_{1A} and T_{1B} terraces on the south side of Cowhouse Creek (Figure 6.111). Two trails bisect the site and a series of several tank hulldowns are present at the edge of the terraces (Figure 6.112). Maximum site dimensions are 65 x 40 m (about 2,600 m^2, or 0.6 acres). For purposes of this report, the site is considered part of the West Cowhouse site group.

6.19.1.2 Previous Work

This site was recorded by Bradle and Strychalski on 16 July 1985. A mussel shell accumulation, a low density of scattered burned rocks and flakes, and a core were observed on the surface of the site. The site was estimated to be 60% disturbed by erosion and vehicular traffic.

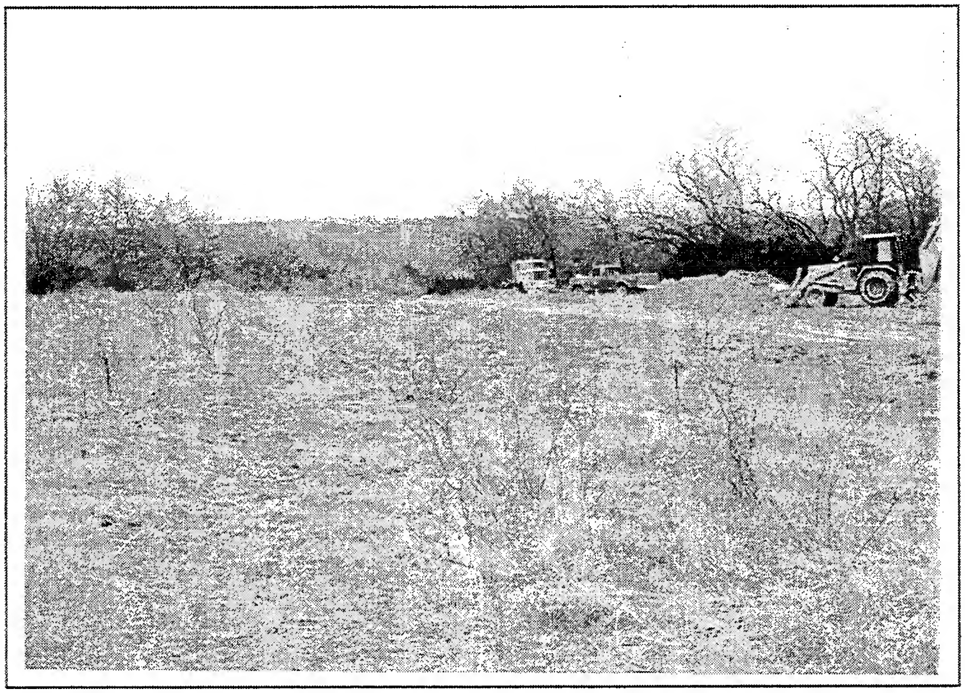

Figure 6.111 Overview of Site 41CV1099, Looking East.

Frederick and Quigg revisited the site on 14 January 1992 and reevaluated the site based on geomorphic and archeological observations. A sparse scatter of cultural material (burned rock and lithics, but very little mussel shell) was observed within a road that crossed a terrace scarp. It was noted that the relative scarcity of mussel shell observed at this time may have been due to the removal of this material during a flood in December 1991. Nine shovel tests were excavated to 40 cmbs across the site. Only one test was positive, with a solitary flake recovered from 10 to 20 cmbs. The lack of subsurface cultural material from 0 to 40 cmbs indicated that this portion of the site held limited archeological potential. However, the possibility of more deeply buried (greater than 40 cmbs) cultural material remained. Therefore, the site's archeological potential was uncertain. The site was recommended for avoidance or for formal testing if avoidance was not possible. A minimum of four backhoe trenches was recommended for formal testing to determine NRHP eligibility (Trierweiler 1994:A1227-A1228).

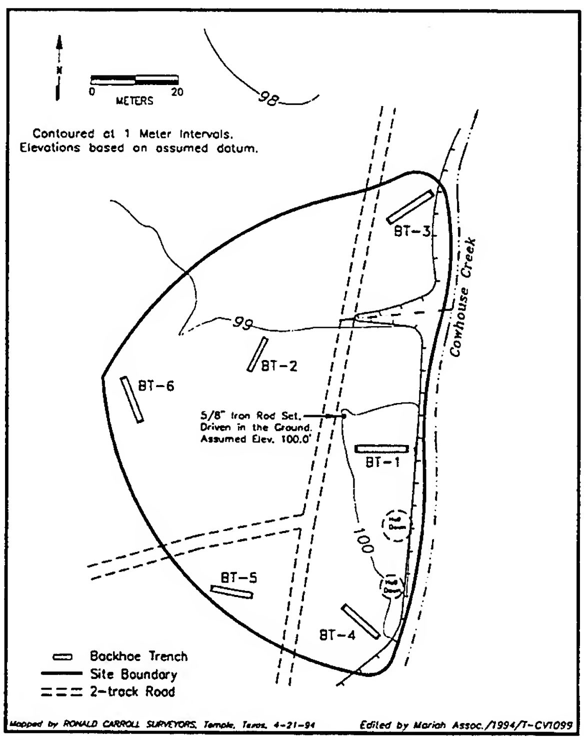

Figure 6.112 Site Map of 41CV1099.

6.19.1.3 New Work

Six backhoe trenches (BTs 1 through 6) were excavated at the site (Table 6.152). Three trenches (BTs 1 through 3) were excavated to examine internal stratigraphy and prospect for buried cultural deposits. Trenches 1 and 2 were placed on the T_{1A} surface, and BT 3 was placed on the T_{1B} surface. The remaining trenches (BTs 4 through 6) were added to ensure an adequate level of subsurface prospection. Only the initial three trenches were described by the geomorphologist. All of the trench walls were manually scraped with trowels and examined for buried cultural materials.

Table 6.152 List of Treatment Units, 41CV1099.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cm)
1	BT 1	11	0.8	370
1	BT 2	9	0.8	370
1	BT 3	12	0.8	330
1	BT 4	10	0.8	340
1	BT 5	8	0.8	300
1	BT 6	10	0.8	350

6.19.2 Results

Trench 1 was situated near the Cowhouse Creek cutbank on the T_{1A} terrace, and was excavated to a depth of approximately 3.6 m. It exhibited an A-AB-Bw-Bk-C profile developed in fine sandy to silty loam. Color varied from very dark grayish brown (10YR 3/2) to brown (10YR 5/3), with depth. With the exception of a very weak subangular blocky structure developed in the Bk horizon, the deposits exposed by the trench were unstructured. No cultural material was detected except a few possibly cultural mussel shells observed scattered throughout the profile.

Trench 2 was situated to span the scarp between the T_{1A} and T_{1B} terraces. It revealed an A-AB-Bw-C profile that was very similar to the profile exposed in BT 1. The principal difference between the two profiles was the presence of an interbedded gravel detected at a depth of approximately 410 to 430 cm. Because no lateral contact was apparent, the trench suggests that the rear portion of the T_{1B} terrace is an erosional feature rather than an expression of a second, distinct fill. Once again, no cultural material was observed.

Trench 3 was situated on the T_{1B} terrace near the Cowhouse Creek cutbank. It revealed a stacked sequence of fine sandy loam packets underlain by crossbedded sands that exhibited an A-C profile. This recent material was 3.2 m thick and underlain by a massive silty loam that probably represents a truncated older fill. No cultural material was observed.

No cultural material was observed in the remaining trenches (BTs 4 through 6), neither while the trenches were being excavated nor after careful inspection of the trench walls.

6.19.3 Conclusions and Recommendations

The T_{1A} terrace and the rear portion of the T_{1B} terrace are underlain by thick, grayish brown (10YR 5/2) to brown (10YR 5/3) fine sandy and silty loams exhibiting a thick A-AB-Bw-Bk-C or A-AB-Bw-C profile. The fill is tentatively interpreted as the late Holocene West Range alluvium on the basis of color and soil development, but may represent the older Fort Hood fill (Nordt 1992). No stratified cultural material was detected in any of the trenches. As a result, the site has very poor potential to address issues outlined in the research design for Fort Hood (Ellis et al. 1994).

On the basis of the foregoing, site 41CV1099 is judged to be not significant and, therefore, ineligible for inclusion in the NRHP. No further management is recommended for the site.

6.20 SITE 41CV1105

6.20.1 Introduction

In late July and early August 1993, Mariah conducted test excavations at site 41CV1105. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.20.1.1 Location and Description

Site 41CV1105 is situated on a terrace overlooking Cowhouse Creek in the western part of Fort Hood (Figure 6.113). An east-to-west oriented two-track road bisects the site (Figure 6.114). Based on previous observations, cutbank exposures, and backhoe trenching results, the site measures approximately 55 x 85 m (about 4,675 m^2, or 1.2 acres). For purposes of this report, the site is considered a member of the West Cowhouse site group.

6.20.1.2 Previous Work

Mesrobian and Masson recorded the site on 19 July 1985. Cultural material visible in and near two 90 cm deep bulldozer cuts, near the terrace edge, led to the discovery of this site. Artifacts observed included bifaces, burned rocks, mussel shell, and debitage. Since all observed material was exposed by bulldozing, it was suggested that much of this terrace could be rich with buried cultural horizons. Hence, excavation or construction on the floodplain was recommended to be monitored. The cultural deposit was estimated to be up to 2.5 m deep and the alluvial fill was estimated to be 6 m deep. The site was recorded as being 70% impacted by a tank trail, bulldozing, and flooding.

On 14 January 1992, Frederick and Quigg revisited the site and conducted an archeological and geomorphological assessment. A major flood in 1991 had inundated this area, resulting in 3 to 4 m of cutbank recession and the redeposition of artifacts and pockets of sediment across the terrace surface, and in particular where flow was blocked

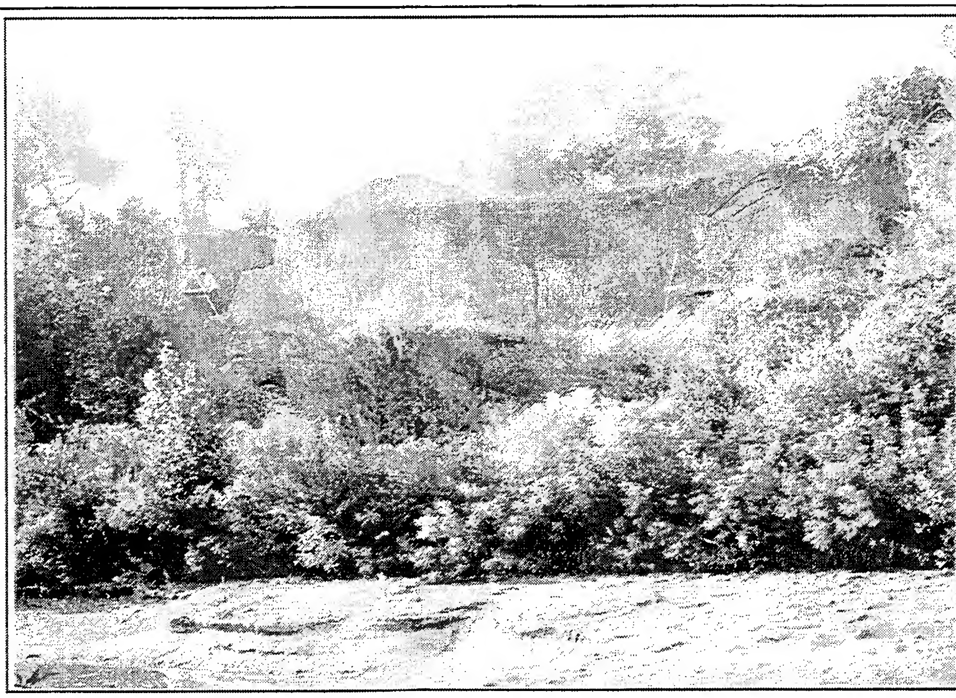

Figure 6.113 Overview of Site 41CV1105, Looking Southeast.

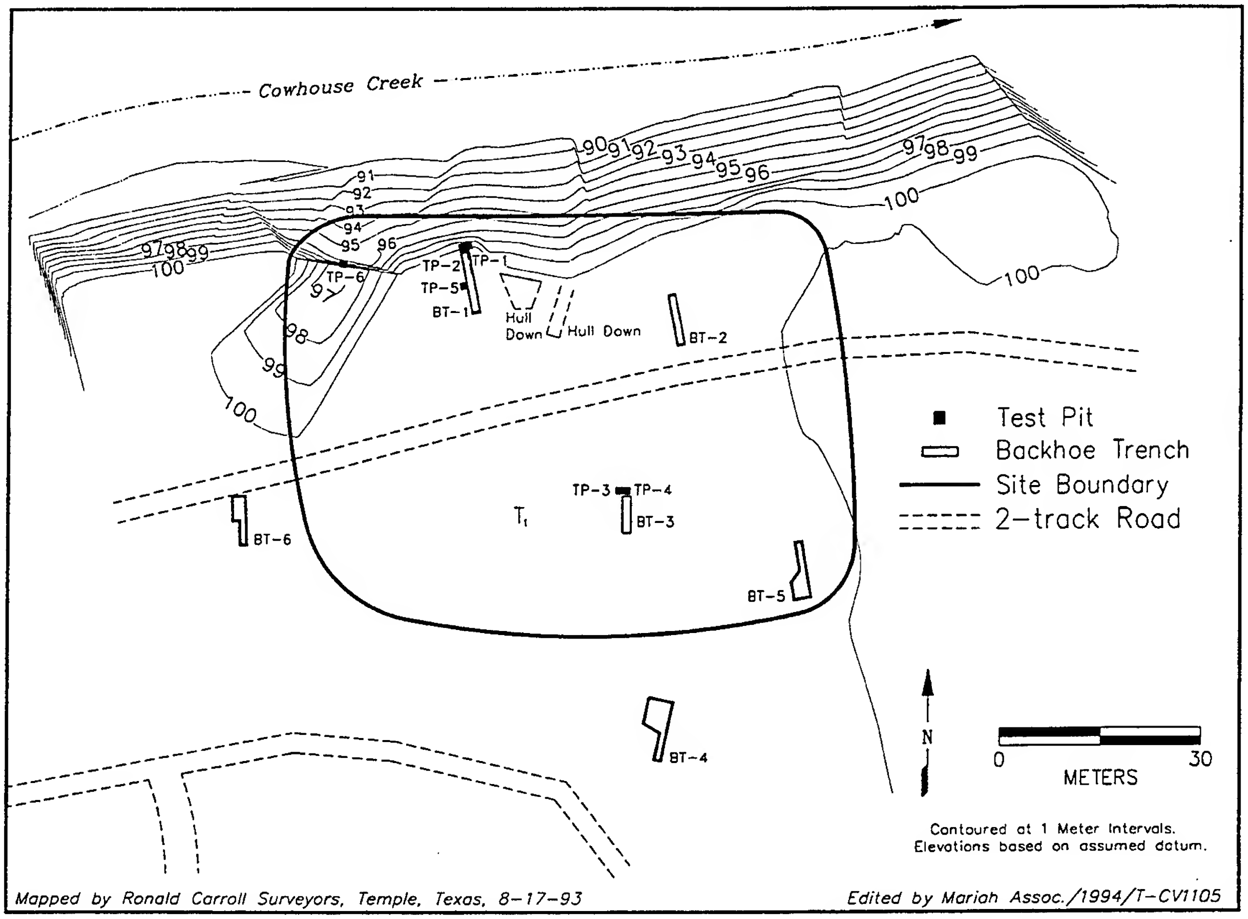

Figure 6.114 Site Map of 41CV1105.

or separated by vegetation. Along a 40 to 50 m stretch of the cutbank, three occupations, composed of burned rocks, lithics, and/or mussel shell, were visible at about 1.0, 1.2, and 2.0 mbs in a single alluvial fill. In addition, a burned area was noted at 3.0 mbs, however, it was uncertain whether this "feature" was cultural or natural. Six shovel tests (to be dug at least 80 cm deep) were recommended.

A crew returned on 10 February 1992 to conduct shovel testing. Five of six tests, all excavated to 80 cmbs, contained cultural material, with four of the positive tests considered to have a high artifact density. At least two zones were determined to be present. On the basis of this work, the site could not be clearly evaluated as either eligible or ineligible for inclusion in the NRHP. The site was recommended for avoidance or for formal testing if avoidance was not possible; it was recommended that testing consist of four to six trenches and 4 to 6 m^2 of manually excavated test pits (Trierweiler 1994:A1240-A1241).

6.20.1.3 New Work

Since the recorded site encompasses a small portion of a rather large alluvial terrace, and because previous bulldozer cuts and cutbank exposures demonstrated that separate, buried components were present, trenching was conducted to help define subsurface site boundaries and determine the number and stratigraphic context of buried occupations. Six backhoe trenches (BTs 1 through 6) and six test pits (TPs 1 through 6) were excavated on the site (Table 6.153). All backhoe

trenches were perpendicular to Cowhouse Creek, with a general north-to-south orientation. Test pits 1 through 3 were placed adjacent to trenches, TP 4 and TP 5 were placed in trench bottoms, and TP 6 was placed on the side of the Cowhouse Creek cutbank. A total of 15.1 m^2 was hand excavated. Recovered cultural materials are summarized in Table 6.154.

6.20.2 Results

All of the backhoe trenches exhibited similar profiles, and the lack of identifiable bounding surfaces indicated that only one alluvial fill was present. All trenches exhibited an A-AB-Bk-C soil profile, but the C horizon was not reached in two of the trenches. The surface horizon in each trench was a very dark grayish brown (10YR 4/2), 30 to 45 cm thick A horizon formed in loamy sediment. This horizon had massive to weak, subangular blocky structure. At least one occupation appeared to be present within this horizon. A 20 to 30 cm thick transitional horizon separated the A horizon from the Bk horizon in nearly every trench examined. This horizon is very dark grayish brown (10YR 4.2) to brown (10YR 5/3), of variable texture (loam, silty clay loam and sandy clay) and includes a few secondary carbonates, usually filamental-encrusting varieties formed in tubular pores with occasional thin films on ped faces. The Bk horizon was brown-dark brown (10YR 5/3/10YR 3/3) and varied between loam, silt loam, and silty clay loam. It exhibited a stage I calcic horizon typified by numerous thin filaments in tubular pores (mycelial forms) and occasional films on ped faces. Differentiation of the Bk horizon on the basis of frequency of secondary carbonate, texture and color was possible, but these subdivisions are difficult to correlate between trenches. The majority of the cultural occupations are contained within the Bk horizon, and burned rock, mussel shell, land snails, and lithic debitage are significant inclusions of this horizon. The C horizon is a yellowish brown loam (10YR 5/6), silt loam, or silty clay loam and does not exhibit abundant secondary carbonate, although a few filaments are present.

Table 6.153 List of Treatment Units, 41CV1105.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cm)
1	BT 1	10	0.7	325
1	BT 2	8	0.8	220
1	BT 3	6	1.2	150
1	BT 4	9	0.8	320
1	BT 5	8	0.8	250
1	BT 6	7	0.8	250
1	TP 1	1.0	1.0	500
1	TP 2	1.0	1.0	250
1	TP 3	1.0	1.0	250
1	TP 4	1.0	1.0	250
1	TP 5	1.0	1.0	250
1	TP 6	1.0	1.0	620

Trench 1 (Figure 6.115) was begun at the cutbank edge and was excavated to 3.25 m. The trench was placed adjacent to a cultural lens (consisting of burned rocks, mussel shell, and snails) visible in the cutbank at 1.0 mbs. Feature 2, a cluster of four burned rocks (5 to 10 cm in size), was located in the east trench wall of BT 1, about 4.8 m south of the northeast corner. In profile, the feature was 28 cm long x 10 cm thick at 140 to 150 cmbs. No associated artifacts or staining were visible. This probable hearth was not excavated.

Test pit 1, excavated from the modern ground surface to 500 cmbs, was placed at the northeast corner of the junction of BT 1 and the edge of the cutbank (Figure 6.116). A Perdiz point, a Marshall point, and a few flakes and burned rocks were found in the upper 10 cmbs. Only a few flakes were found in each of the following three levels. Artifact frequencies steadily increased from 40 cmbs (5 items) to 110 cmbs (39 items), with flakes, burned rocks, and mussel shell fragments recovered from each of these levels. The lens of burned rocks exposed in the cutbank and in the east wall of BT 1 was encountered at 110 to 117

Table 6.154 Artifact Recovery by Test Pit, 41CV1105.

	TEST PIT 1					TEST PIT 2					TEST PIT 3				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	3	2	4(0.3)	0	0	1	3	5(1.5)	0	0	0	0	1(0.2)
2	0	0	3	0	0(0)	0	0	0	0	1(0.9)	0	0	1	0	0(0)
3	0	0	2	0	0(0)	0	0	1	0	0(0)	0	0	0	0	0(0)
4	0	0	2	0	1(0.3)	0	0	0	0	0(0)	0	0	9	0	2(0.2)
5	1	0	1	0	3(0.2)	1	0	1	0	0(0)	0	0	5	0	3(0.2)
6	0	0	1	0	1(0.2)	0	0	1	0	0(0)	0	0	7	0	4(0.5)
7	1	0	4	0	3(0.2)	1	0	5	0	0(0)	0	0	10	0	10(2)
8	0	0	2	0	2(0.3)	1	0	0	0	3(0.9)	0	0	37	0	24(3)
9	5	0	10	0	4(0.2)	0	0	0	0	8(0.9)	16	0	12	0	17(1)
10	13	0	10	1	2(0.2)	1	0	2	0	2(0.9)	3	0	17	0	13(0.5)
11	40	0	32	1	9(3)	8	0	3	0	0(0)	7	0	10	1	9(0.3)
12	70	0	83	0	34(13.0)	12	0	13	0	5(1)	5	0	4	0	5(0.5)
13	9	0	13	0	2(0.2)	68	0	12	0	6(0.9)	0	0	1	0	2(0.2)
14	3	0	0	0	3(0.2)	19	0	13	0	4(0.9)	0	0	2	0	1(0.2)
15	1	0	0	0	0(0)	11	3	2	0	0(0)	0	0	0	0	2(0.2)
16	0	0	0	0	0(0)	7	1	5	0	3(0.9)	0	0	0	0	1(0.1)
17	0	0	0	0	0(0)	9	1	5	0	8(1.3)	0	0	0	0	0(0)
18	1	0	0	0	0(0)	10	0	0	0	32(15)	0	0	0	0	1(0.2)
19	11	0	0	0	0(0)	1	0	0	0	0(0)	0	0	0	0	0(0)
20	0	0	0	0	0(0)	0	0	0	0	1(0.9)	0	0	0	0	0(0)
21	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
22	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
23	1	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
24	0	0	0	0	0(0)	0	0	0	0	0(0)	1	0	0	0	0(0)
25	24	0	0	0	0(0)	0	0	0	0	1(0.9)	0	0	0	0	0(0)
26	1	0	0	0	0(0)										
27	23	0	0	0	3(0.5)										
28	5	0	0	0	1(0)										
29	0	0	0	0	0(0)										
30	0	0	0	0	0(0)										
31	8	0	0	0	1(0.5)										
32	0	0	1	0	0(0)										
33	0	0	0	0	0(0)										
34	0	0	0	0	0(0)										
35	0	0	0	0	0(0)										
36	0	0	0	0	0(0)										
37	0	0	0	0	0(0)										
38	0	0	0	0	1(0.2)										
39	0	0	0	0	0(0)										
40	0	0	0	0	0(0)										
41	0	0	0	0	0(0)										
42	0	0	0	0	0(0)										
43	0	0	0	0	0(0)										
44	0	0	0	0	0(0)										
45	0	0	0	0	3(0.2)										
46	7	0	0	0	0(0)										
47	0	0	0	0	0(0)										
48	0	0	0	0	0(0)										
49	1	0	0	0	0(0)										
50	1	0	0	0	0(0)										
51															
52															
53															
54															
55															
56															
57															
58															
59															
60															
61															
62															
TOTAL	226	0	167	4	77(19.7)	149	5	64	3	78(26)	32	0	115	1	95(9.3)

	TEST PIT 4					TEST PIT 5					TEST PIT 6				
LEVEL	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	0	0	0(0)	0	0	0	0	0(0)					
2															
3															
4	not screened														
5															
6															
7	0	0	7	0	8(1)										
8	1	0	13	1	18(4.5)										
9	12	0	6	0	8(0.5)										
10	8	0	22	0	16(0.9)	not screened									
11	16	0	4	0	14(0.5)										
12	0	0	2	0	3(0.2)										
13	0	0	0	0	10(0.4)										
14	0	0	2	0	1(0.1)										
15	0	0	0	0	1(0.1)										
16	0	0	0	0	0(0)										
17	0	0	0	0	0(0)						not screened				
18	0	0	0	0	0(0)	1	0	1	0	12(11)					
19	0	0	0	0	0(0)	5	0	0	0	1(0.9)					
20	0	0	0	0	0(0)	8	0	0	0	0(0)					
21	0	0	0	0	0(0)	0	0	0	0	0(0)					
22	0	0	0	0	0(0)	6	0	0	0	0(0)					
23	0	0	0	0	2(0.3)	0	0	0	0	0(0)					
24	0	0	0	0	0(0)	0	0	0	0	0(0)					
25	0	0	0	0	0(0)	0	0	0	0	0(0)					
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															
36															
37															
38											0	0	0	0	0(0)
39											0	0	0	0	0(0)
40											0	0	0	0	0(0)
41											0	0	0	0	0(0)
42											0	0	0	0	0(0)
43											0	0	0	0	0(0)
44											3	0	0	0	0(0)
45											0	0	0	0	0(0)
46											0	0	0	0	0(0)
47											0	0	0	0	0(0)
48											0	0	0	0	0(0)
49											0	0	0	0	0(0)
50											0	0	0	0	0(0)
51											0	0	0	0	0(0)
52											0	0	0	0	2(0.3)
53											0	0	0	0	2(0.3)
54											0	0	0	0	0(0)
55											0	0	0	0	0(0)
56											0	0	0	0	0(0)
57											0	0	0	0	0(0)
58											0	0	0	0	0(0)
59											0	0	0	0	0(0)
60											0	0	0	0	0(0)
61											0	0	0	0	0(0)
62											0	0	0	0	0(0)
TOTAL	37	0	56	1	81(8.5)	20	0	1	0	13(11.9)	3	0	0	0	4(0.6)

cmbs. A hearth was located within this lens and designated F 1 (Figure 6.117). It consisted of a semicircular, shallow, basin-shaped hearth delimited by a tight burned rock cluster (n=28, 12.5 kg) contained within the northwest quadrant of the unit (see Figure 6.115). Cutbank erosion

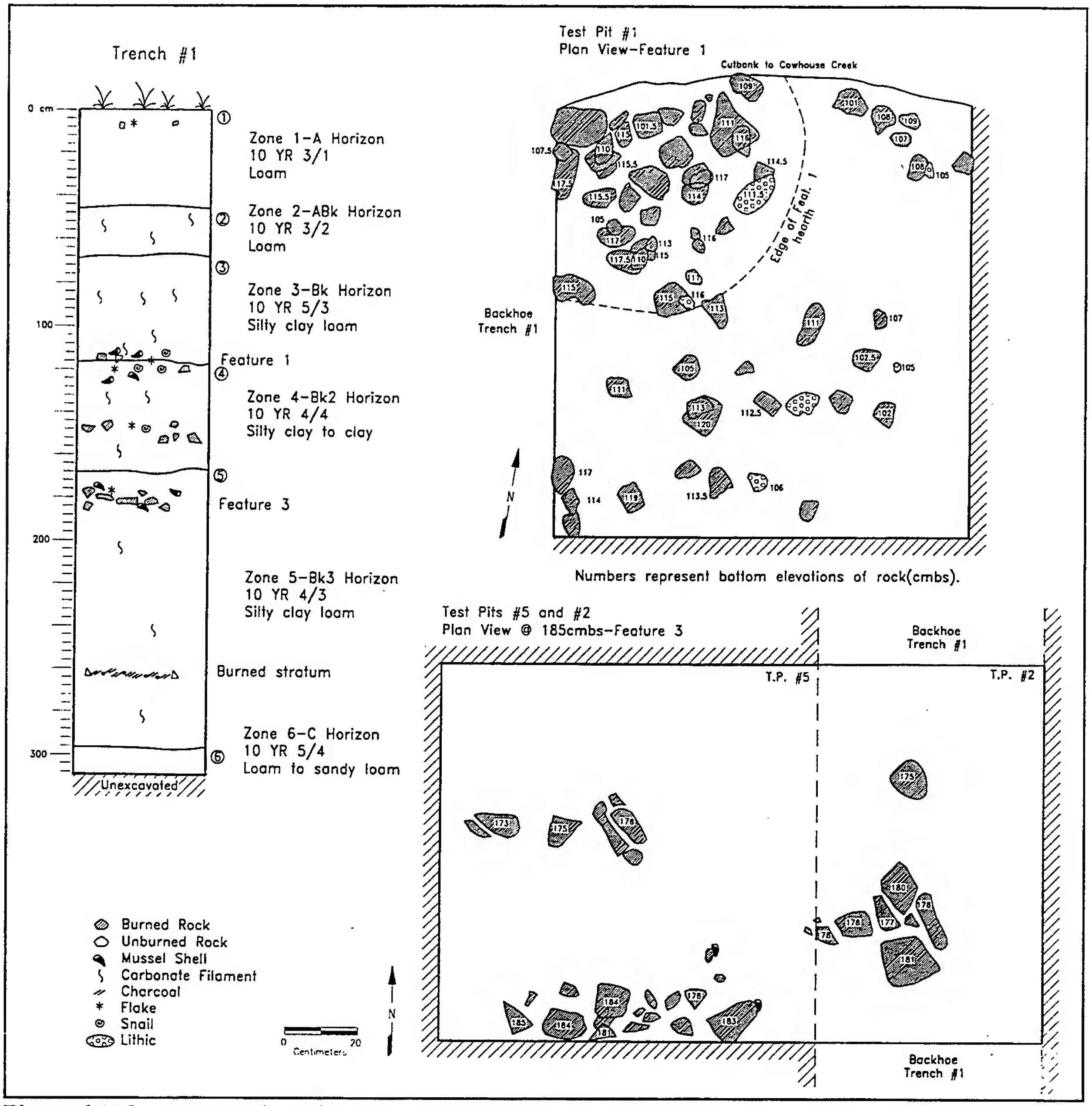

Figure 6.115 Measured Section, BT 1, and Plans of F 1 (120 cmbs) in TP 1 and F 3 (185 cmbs) in TPs 2 and 5, 41CV1105.

and trench excavation removed a portion of the feature; however, the hearth was obviously intact at the time of excavation judging from the fact that conjoinable faces of fire-cracked rocks were immediately adjacent to each other. Only a few mussel shells were found within the feature fill. Material on the paleosurface surrounding the hearth included debitage, mussel shell, scattered burned rocks, and a large utilized flake. A dense pocket of snails was present along the northeast edge of the hearth. No charcoal or staining was readily visible.

Below F 1, the remainder of Level 12 (117 to 120 cmbs) and Level 13 contained the same artifact assemblage associated with the feature. A few

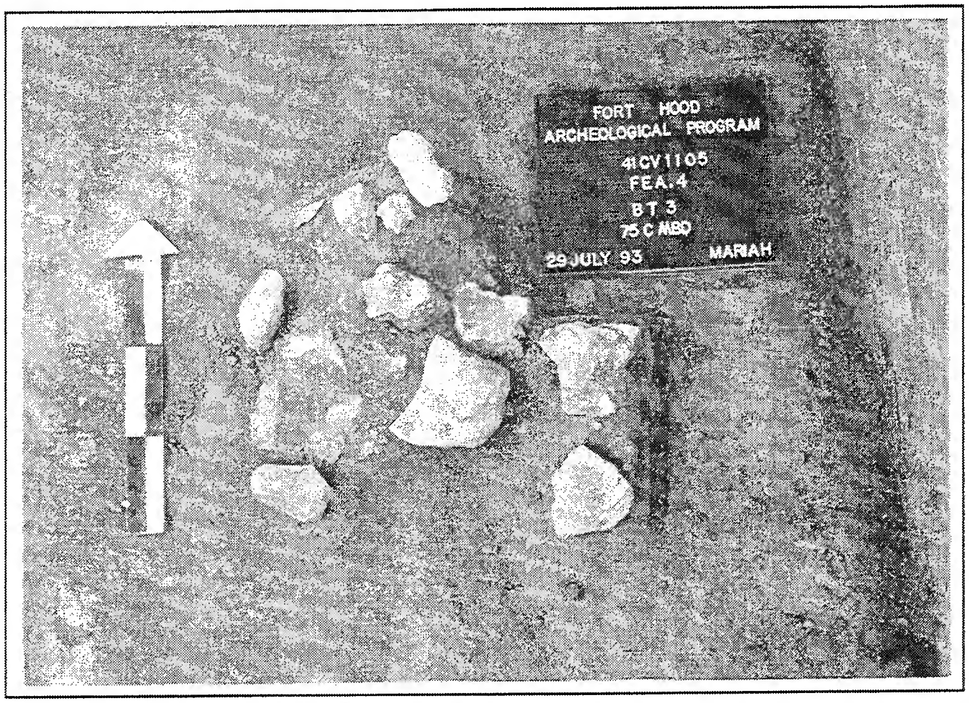

Figure 6.116 Feature 4, 41CV1105, Looking North.

burned rocks and mussel shell fragments, found from 130 to 140 cmbs, is probably material filtered down from the horizon containing F 1. Levels 15 through 50 were virtually devoid of cultural material. Shell fragments were found in about half of these levels and an occasional level contained a flake or burned rock.

Two radiocarbon ages were obtained from the body of the fill below F 1 in TP 1, to date the age of the alluvial fill. One age, 6280 ± 60 BP (Beta b-70032), was obtained from Level 28, while a second age of 7190 ± 90 BP (Beta b-70031) was obtained from Level 49. These ages indicate that the body of the terrace is equivalent to the Fort Hood fill of Nordt (1992).

Test pit 2 was offset from the west wall of BT 1, above a burned rock concentration noted in the trench floor, and excavated to 250 cmbs. In TP 2, Levels 1 through 11, contained a light density of lithics, mussel shell, and a few burned rocks. The artifact frequency clearly increased in Levels 12 through 18. Several flakes, mussel shells, and burned rocks were found in the vast majority of these levels. The burned rock concentration, designated F 3, was encountered from 167 to 185 cmbs and extended beyond the test pit into the floor of BT 1 (see Figure 6.115). The feature rested on a gently sloping, buried paleosurface that dipped away from the channel. Within TP 2, 23 blocky burned rocks (11 kg) were clustered in a 65 x 25 cm area along the south wall, which may represent the edge of a hearth that extends south of the test pit. Nine burned rocks (4 kg) were present near the central portion of the test pit. The burned rocks ranged from gravel size up to pieces 15 cm long x 6 cm thick. Below F 3, Levels 19 through 25 contained an occasional burned rock and/or mussel shell.

Test pit 5 was placed within BT 1, adjacent to TP 2, to help better define F 3. Excavation of TP 5 began at the bottom of the trench at 170 cmbs, and excavation terminated at 250 cmbs. Feature 3 was encountered from 175 to 181 cmbs within this test

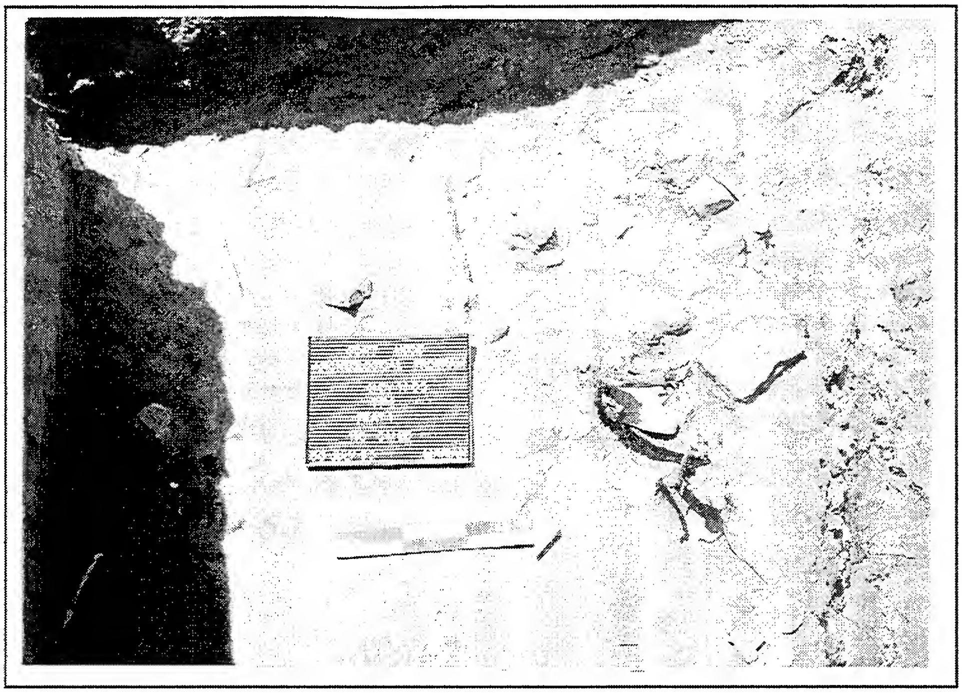

Figure 6.117 Planview of F 1, 41CV1105, Looking West.

pit. In TP 5, F 3 was composed of 12 burned rocks (11 kg), most of which were greater than 10 cm in diameter (see Figure 6.114). These were clustered in the southwestern portion of the test pit. It could not be determined whether this was a separate feature or if it was contiguous with the burned rock in TP 2, hence the designation of burned rock concentration. Charcoal flecks, a flake, and mussel shell were observed in association with the feature. Mussel shell fragments and a burned rock were found in the level below the feature and Levels 20 through 25 were culturally sterile.

Trench 2 was placed about 30 m east of BT 1 and 5 to 10 m south of the Cowhouse cutbank. Although scattered mussel shell and burned rocks were noted at both 70 to 80 cmbs and 120 to 130 cmbs in the trench walls, no manual excavation units were placed off of this trench.

Trench 3 was placed about 25 m south to southwest of BT 2. A hearth, designated F 4, was exposed 70 to 80 cmbs in the trench bottom. Test pit 3 was offset from the west wall of BT 3 and excavated to 250 cmbs. Very little cultural material was found in the upper 30 cm of TP 3. The artifact density increased substantially from 30 to 70 cmbs, was densest from 70 to 110 cmbs, and rapidly decreased from 110 to 160 cmbs. Recovered material from these levels included scattered burned rocks (smaller than 5 cm in size), lithics, and mussel shell. In addition to these artifacts, a Bulverde point was found at 103 cmbs. The level containing the highest densities of artifacts (70 to 80 cmbs) corresponds with the depth of F 4 in TP 4. Levels 17 through 25 were virtually devoid of cultural material.

Test pit 4 was placed adjacent to TP 3, in the bottom of BT 3, and excavated from 60 to 250 cmbs. The upper 60 cm of TP 4 were previously removed by the backhoe. From 60 to 70 cmbs, several flakes and burned rocks were found. Feature 4 was located between 68 and 78 cmbs. It consisted of a semicircular, slightly basin-shaped

hearth that sloped gradually away from the channel (Figure 6.118). The southern portion of the feature was destroyed during trenching; however, a 40 cm diameter portion of the feature remained intact. Eighteen clustered burned rocks (4.5), most of which were less than 10 cm in diameter, were recovered from the feature (Figure 6.119). Several flakes, burned rocks, and a Yarbrough point found at 76 cmbs were associated with the feature. No staining was observed within the feature fill.

As with adjacent TP 3, the highest artifact densities occurred from 70 to 110 cmbs in TP 2. Again, several burned rocks, flakes, and a few mussel shells were found in these high artifact density levels. Artifact counts decreased by more than half in Levels 12 and 13 and very little cultural material was recovered from 130 to 250 cmbs.

Trench 4 was situated 30 m south of BT 3 and was excavated to 3.2 mbs. A few scattered burned rocks were observed in the trench wall at 70 to 80 cmbs. Trench 5 was situated 30 m east of BT 4 and was excavated from to 2.5 mbs. As in BT 4, a few burned rocks were exposed 70 to 80 cmbs. Trench 6 was placed 40 to 50 m west to southwest of BT 1 and excavated to 2.5 mbs. No cultural material was observed within the trench.

Test pit 6 was placed on a ledge of the cutbank of Cowhouse Creek, where a burned lens was noted by previous investigators. The lens is about 35 m west of TP 1 and is eroding out of the cutbank at 3.7 m below the upper edge of the cutbank (terrace). Beginning at 370 cmbs, the unit was excavated to 620 cmbs. Recovery from TP 6 was extremely sparse. The burned earth lens was encountered at 421 cmbs along the entire northern edge of the unit. The burned area continuously migrated south in successive levels, with a final depth of 450 cmbs along the south wall. The lens, in profile, has a 7 to 10 cm layer of orange burned clay (5YR 5/6) capped with a 3 cm layer of reddish brown clay (5YR 5/4), a dramatic slope north to south, and a flat base. This appears to be a natural phenomenon based on morphology and lack of associated cultural material. Charcoal and burned snails were found within the fill and material observed outside the burned area included snails, a mussel shell umbo, unburned limestone, a gravel, and hackberry seeds.

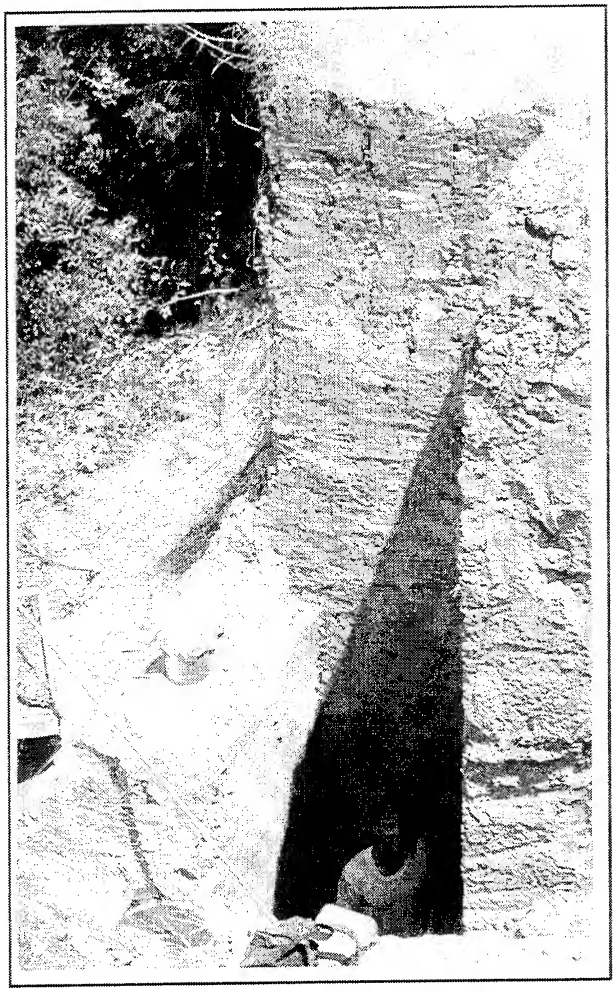

Figure 6.118 Profile of TP 1, 41CV1105, Looking East (dug by Don Badon).

Four projectile points, including a Perdiz arrow point and Marshall, Yarbrough, and Bulverde dart points, were recovered from the site. All of these points, which represent Early Archaic through Late Prehistoric traditions, were recovered from the upper 1.1 m of deposits. Lithic materials represented are diverse, and include identified types characteristic of the North Fort and Southeast Range chert provinces (Table 6.155). The

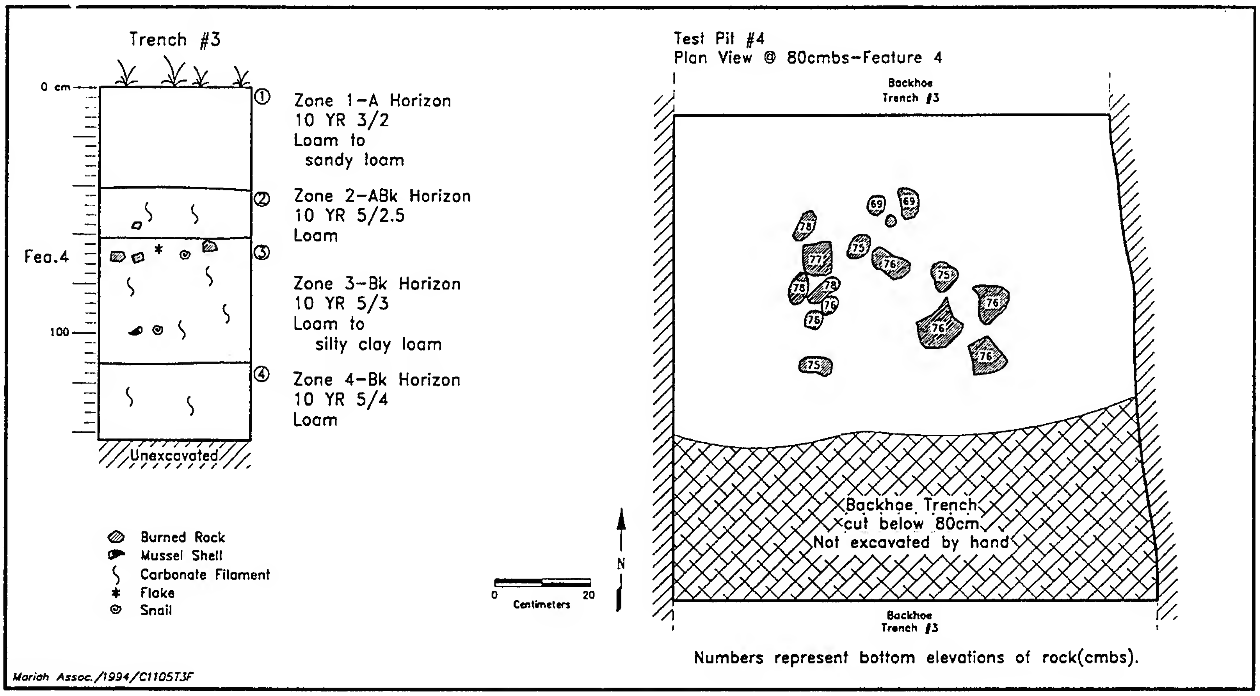

Figure 6.119 Measured Section, BT 3, and Plan of F 4 (80 cmbs), TP 4, 41CV1105.

Southeast Range variety, Heiner Lake Tan, is also well represented in the small non-debitage lithic assemblage (Table 6.156). The assemblage contains one multiple platform core, two bifaces, two preforms of Heiner Lake Tan chert, and a uniface.

A moderately large, diverse debitage assemblage consisting of 13 identified chert types and eight indeterminate chert categories were recovered from the site (Table 6.157). Roughly 37% of the assemblage was identified. When the entire assemblage was considered, Heiner Lake Tan and the aggregate indeterminates occurred in greater than expected frequencies and the remainder of identified types occurred in less than expected frequencies. When the indeterminates were excluded, Heiner Lake Tan occurred in greater than expected frequency; Fort Hood Yellow, Heiner Lake Translucent Brown, Fort Hood Gray, Gray/Brown/Green, and Owl Creek Black occurred in expected frequencies; and Anderson Mountain

Table 6.155 Projectile Points, AU 1, 41CV1105.

	Lithic Material				
Point Type	06-HL Tan	15-Gry/Brn/Grn	Indet Dk Brown	Indet Lt Brown	Total
Bulverde	0	0	1	0	1
Marshall	1	0	0	0	1
Perdiz	0	0	0	1	1
Yarbrough	0	1	0	0	1
Total	**1**	**1**	**1**	**1**	**4**

Gray, Texas Novaculite, Fossiliferous Pale Brown, Heiner Lake Blue, East Range Flat, Black, Cowhouse Mottled, and Table Rock Flat occurred in less than expected frequencies (Table 6.158).

All four identified chert provinces are represented in the assemblage, although the relative contribution of each is relatively surprising given the geographic location of the site. The majority of material (roughly 70% of the identified total) is comprised of four types characteristic of the Southeast Range province, which lies more than 20 km to the southeast. In contrast, the local Cowhouse province, which effectively lies within the site boundary, contributes two types that together comprise only 2% of the identified total. The North Fort Province is represented by six types that make up approximately 26% of the total, while West Fort also comprises 2%.

The majority of the assemblage is relatively small (77% is less than 1.8 cm) and decortified (88% of total), suggesting that latter-stage reduction predominated. Although little of the material was cortical, abraded cortex outnumbered unabraded cortex by three to one, suggesting that stream procurement was an important source of lithic material (Table 6.159). Abraded cortical flakes were composed of both Southeast Range and North Fort chert types, suggesting that alluvial sources elsewhere on the base were exploited and that channel morphology and/or flow conditions in Cowhouse Creek may not have been conducive to chert procurement from the adjacent channel during the time of occupation.

Although a few unidentifiable bones were found, the majority of the faunal assemblage consists of whole and fragmentary mussel shell, indicating that aquatic resources were a significant contributor to the subsistence strategy (Table 6.160). A minimum of at least five distinct mussel taxa are represented, although the identified fraction is overwhelmingly dominated by *Ambleminae* sp. and *Lampsilinae* sp., which tend to prefer deep, relatively slow-moving to still water.

Table 6.156 Cores and Nonprojectile Point Lithic Tools, AU 1, 41CV1105.

	Core Type	Tool Type				
Lithic Material	multiple platform	early stage biface	late stage biface	preform	uniface	Total
06-HL Tan	0	0	1	2	1	4
Indet Dk Gray	1	0	0	0	0	1
Indet Lt Gray	0	1	0	0	0	1
Total	**1**	**1**	**1**	**2**	**1**	**6**

Table 6.157 Debitage Recovery by Size and Material Type, AU 1, 41CV1105.

	Size (cm)						
Lithic Material	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	Total
Identified Types							
03-AM Gray	0	0	1	2	1	0	4
05-Texas Novac	0	0	0	1	0	0	1
06-HL Tan	9	22	38	16	9	1	95
07-Foss Pale Brown	0	0	0	0	0	1	1
08-FH Yellow	0	1	9	2	1	0	13
09-HL Tr Brown	0	0	4	1	0	0	5
10-HL Blue	0	0	0	1	1	0	2
11-ER Flat	0	0	0	1	0	0	1
14-FH Gray	0	3	6	3	2	0	14
15-Gry/Brn/Grn	0	0	3	2	0	0	5
17-Owl Crk Black	1	0	1	2	0	0	4
18-C Mottled	0	0	0	0	2	0	2
28-Table Rock Flat	0	0	0	0	1	0	1
Subtotal	*10*	*26*	*62*	*31*	*17*	*2*	*148*
Unidentified Types							
Indet Black	2	2	1	0	0	0	5
Indet Dk Brown	1	5	7	2	0	0	15
Indet Dk Gray	6	40	20	11	3	0	80
Indet Lt Brown	7	26	42	7	3	0	85
Indet Lt Gray	5	10	8	5	1	0	29
Indet Misc.	0	10	7	2	0	0	19
Indet Mottled	0	2	10	3	3	0	18
Indet White	0	1	1	1	0	0	3
Subtotal	*21*	*96*	*96*	*31*	*10*	*0*	*254*
Total	**31**	**122**	**158**	**62**	**27**	**2**	**402**

Table 6.158 Binomial Statistic Results, AU 1, 41CV1105.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
03-AM Gray	4	18	39	less	5	18	less
05-Texas Novac	1	18	39	less	5	18	less
06-HL Tan	95	18	39	more	5	18	more
07-Foss Pale Brown	1	18	39	less	5	18	less
08-FH Yellow	13	18	39	less	5	18	expected
09-HL Tr Brown	5	18	39	less	5	18	expected
10-HL Blue	2	18	39	less	5	18	less
11-ER Flat	1	18	39	less	5	18	less
14-FH Gray	14	18	39	less	5	18	expected
15-Gry/Brn/Grn	5	18	39	less	5	18	expected
17-Owl Crk Black	4	18	39	less	5	18	less
18-C Mottled	2	18	39	less	5	18	less
28-Table Rock Flat	1	18	39	less	5	18	less
Total Indet	254	18	39	more	na	na	na

6.20.3 Conclusions and Recommendations

The site is situated within what was interpreted in the field as the floodplain facies of a single, major alluvial fill of Cowhouse Creek. However, while the artifacts from the upper 2 m of the fill are largely indicative of Middle Archaic through Late Prehistoric occupation (the one possible Early Archaic Bulverde point is in the same stratigraphic context as the later Archaic points, and is probably an heirloom item collected and brought to the site by later people), radiocarbon ages from deeper in the fill indicate that the body of the terrace is composed of early-middle Holocene Fort Hood alluvium. This suggests that the upper 1 to 2 m of the terrace is actually more recent alluvium (e.g., West Range) that was deposited incrementally on top of the terrace and welded to it by pedogenic processes. The abundant fine lithic debris and land snails in association with cultural features suggest that burial of the majority of the occupations at this site were accomplished through slow, quiescent floodplain (overbank) sedimentation.

The site contains stratified assemblages that include intact features and other artifacts. Peak frequencies of lithic artifacts in levels of nonadjacent test pits suggest that the site may contain a relatively expansive occupation. The profile of BT 1 shows good evidence of at least three stratified occupations. The site therefore contains stratigraphically discrete assemblages composed of artifactual data in depositional conditions very well suited for technological studies according to the research design for Fort Hood (Ellis et al. 1994). The site also contains abundant faunal materials (mussel shells) that can contribute to subsistence studies specified in the research design. As a result, the site has high potential to provide insight into technological systems and decision-making processes that accompanied adaptively significant activities in an alluvial setting along a major drainage in the Fort Hood area. In addition, the site has geomorphic characteristics and faunal materials (land snails) relevant to the reconstruction of paleoclimate and paleolandscape processes. As a result, the site is significant with respect to its potential to contribute data for environmental problems central to the cultural ecological focus of the research design.

On this basis, site 41CV1105 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the known eligible components are relatively deeply buried, they are fairly well protected from training and other activities that affect only the surface of the site. However, adverse impacts from uncontrolled excavations (as evidenced by the bulldozer cuts that led to discovery of the site) and erosion (as evidenced by loss of 3 to 4 m of cutbank deposits in the 1991 flood) pose substantial threats to this scientifically valuable site. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, (2) prevent mechanical or manual excavations by military personnel, and (3) minimize the impact of further erosion on the cutbank.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1993.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 150 m^2 in area. Known occupations with features occur at the site at a minimum depth of approximately 60 cmbs and a maximum depth of approximately 190 cmbs, yielding up to approximately 195 m^2 of manual excavation to mitigate the known occupations. However, the top elevation of known occupations varies from approximately 50 to 100 cmbs, and the thickness of strata with known occupations ranges from approximately 60 to 90 cm (with a mean of 73 cm). Thus, carefully executed mechanical excavations to remove overburden may place the volume of manual mitigation excavations at approximately 110 m^2. Because unknown, intact buried occupations may occur at elevations higher than the known occupations, overburden removal should be carefully monitored. Discovery of such occupations would increase mitigation requirements by an unknown amount.

Table 6.159 Debitage Cortex Characteristics by Material Type, AU 1, 41CV1105.

	Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types						
03-AM Gray	0	0	0	4	0	4
05-Texas Novac	0	0	0	1	0	1
06-HL Tan	3	4	0	88	0	95
07-Foss Pale Brown	1	0	0	0	0	1
08-FH Yellow	0	0	1	12	0	13
09-HL Tr Brown	0	0	0	5	0	5
10-HL Blue	2	0	0	0	0	2
11-ER Flat	0	0	1	0	0	1
14-FH Gray	2	0	0	12	0	14
15-Gry/Brn/Grn	1	0	0	4	0	5
17-Owl Crk Black	1	0	0	3	0	4
18-C Mottled	0	0	0	2	0	2
28-Table Rock Flat	0	0	1	0	0	1
Subtotal	*10*	*4*	*3*	*131*	*0*	*148*
Unidentified Types						
Indet Black	0	0	0	5	0	5
Indet Dk Brown	0	0	0	15	0	15
Indet Dk Gray	5	0	2	72	1	80
Indet Lt Brown	8	2	0	75	0	85
Indet Lt Gray	1	2	0	25	1	29
Indet Misc.	4	0	0	15	0	19
Indet Mottled	5	1	0	12	0	18
Indet White	0	0	0	3	0	3
Subtotal	*23*	*5*	*2*	*222*	*2*	*254*
Total	**33**	**9**	**5**	**353**	**2**	**402**

The total mitigation volume estimated above also does not include potential intact deposits that may be present at greater depths. Test excavations described in this report did not reach down into the

deepest Holocene deposits at the site, so it is not known if significant intact deposits are present in deep stratigraphy. Therefore, if mitigation is required, it will be necessary to prospect for deeply buried cultural components that may add an unknown volume of manual excavations to the amount estimated above in order to mitigate the site. However, sounding for deeply buried components will involve mechanical excavation that could severely compromise known intact deposits. Hence, if mitigation is required, it will be necessary to perform mitigation and sounding excavations in a carefully coordinated sequence that minimizes damage to known, scientifically productive contexts and maximizes effectiveness of subsurface prospection.

6.21 SITE 41CV1116

6.21.1 Introduction

In late October and early November 1993, Mariah conducted test excavations at site 41CV1116. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.21.1.1 Location and Description

Site 41CV1116 is located on the north side of Table Rock Creek (Figure 6.120). The site is situated on alluvial terrace surfaces (Figure 6.121). A small gully flowing into Table Rock Creek forms the northern boundary of the site, and a corral is located approximately 80 m south of the site. Maximum site dimensions are approximately 40 x 50 m (about 2,000 m^2, or 0.5 acres). For the purposes of this report, the site is considered a member of the Table Rock site group.

6.21.1.2 Previous Work

This site was initially recorded by Dureka, Michaels, and Masson on 31 July 1985 as a burned rock mound. A low density of debitage, bifaces,

Table 6.160 Faunal Recovery, AU 1, 41CV1105.

	Element			
Vertebrates	Indeterminate	left	right	Total
Mammalia	5	0	0	5
Bivalves				
Amblema plicata	0	20	31	51
Ambleminae	0	33	30	63
Lampsilinae	0	19	24	43
Lampsilis sp.	0	0	2	2
Quadrula houstonensis	0	3	1	4
Quadrula sp.	0	2	1	3
Toxolasma texasensis	0	4	0	4
Tritigonia verrucosa	0	0	1	1
Unionacea	0	10	12	22
Total	**0**	**91**	**102**	**193**

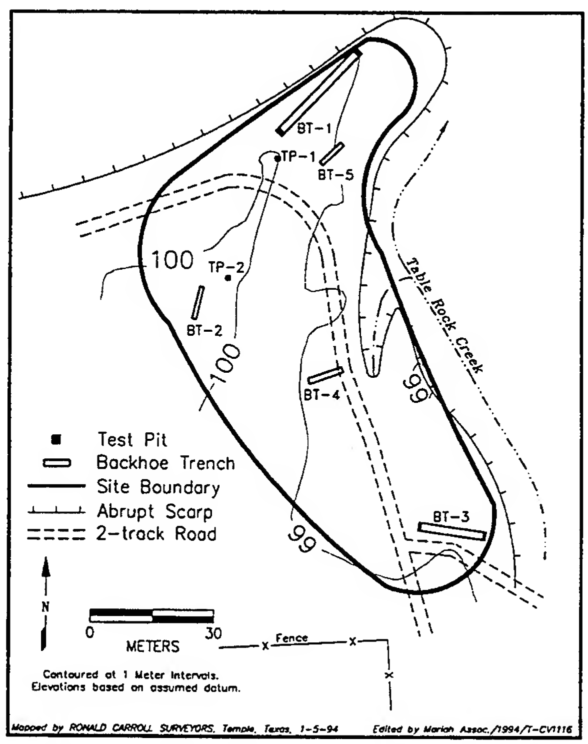

Figure 6.120 Site Map of 41CV1116.

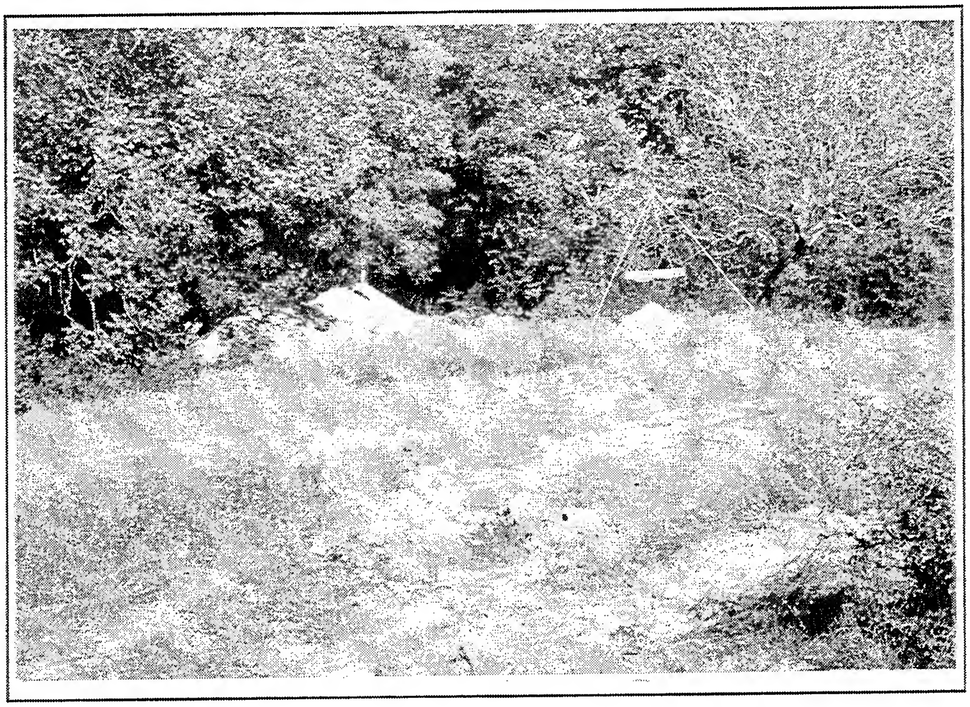

Figure 6.121 Overview of Site 41CV1116, Looking East.

mussel shell, and an end scraper were observed. The site was estimated to be about 35% disturbed by erosion, vehicular traffic, and cedar pushing. The site was also estimated to have 50 cm of sandy loam deposits.

Quigg, Abbott, and Frederick revisited the site in January 1992 and reevaluated the site using archeological and geomorphic criteria. The "burned rock mound" described by the initial surveyors was not relocated. Because the site had the potential for intact cultural deposits, four shovel tests were excavated. Two lithics and nine burned rocks were recovered from 0 to 20 cmbs in one shovel test. In another shovel test, one flake was recovered from the upper 10 cm and three burned rocks were recovered from 40 to 50 cmbs. The results of shovel testing suggested that the site contained buried cultural material which appeared to be in good context. However, the eligibility status of the site was uncertain and the site was recommended for avoidance or for formal testing if avoidance was not possible. Two to four 1 x 1 m of manually excavated test pits and four to five backhoe trenches were suggested to clearly determine NRHP eligibility (Trierweiler 1994:A1116-A1117).

6.21.1.3 New Work

Two 1 m x 1 m test pits (TP 1 and TP 2) and five backhoe trenches (BTs 1 through 5) were excavated (Table 6.161). Trenches 1, 2 and 5 were determined to be within the site boundaries, while BT 3 and BT 4 were excavated on a flat terrace just above Table Rock Creek south of the established site boundary (Figure 6.121). The test pits were excavated as isolated units. Test pit 1 was excavated to 2 mbs and TP 2 was excavated to 1 mbs. Recovered cultural material is summarized in Table 6.162.

6.21.2 Results

Trench 1 extended back from near the confluence of the small gully that forms the northern site

boundary and Table Rock Creek. The subtle topography in this part of the site was presumed to be indicative of a subsurface fill boundary and the trench was intended to expose such an unconformity if it was present. At least two, and possibly three alluvial deposits were observed in this trench. An A-AB-Bk-2Bk soil profile was observed formed in the sediments exposed by this trench. The top 1.2 m of this deposit was presumed to correlate with the West Range and/or the Ford alluvial units (Nordt 1992) and consisted of dark yellowish brown (10YR 4/4), to very dark gray (10YR 3/1), medial overbank sediments ranging in field texture from a loam to a silt loam.

Table 6.161 List of Treatment Units, 41CV1116.

AU	Treatment Unit	Length (m)	Width (m)	Depth cm)
1	BT 1	32	0.8	230
1	BT 2	5	3	390
1	BT 3	15	0.8	290
1	BT 4	8	0.8	350
1	BT 5	10	0.8	230
1	TP 1	1.0	1.0	200
1	TP 2	1.0	1.0	100

Table 6.162 Artifact Recovery by Test Pit, 41CV1116.

	TEST PIT 1					TEST PIT 2				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	40	0	32(3)	0	0	1	0	0(0)
2	0	0	48	1	8(0.8)	0	0	1	0	0(0)
3	0	1	26	0	7(0.5)	0	0	0	0	0(0)
4	0	0	9	0	2(0)	0	0	0	0	1(0.3)
5	0	0	6	0	2(0.3)	0	0	0	0	0(0)
6	0	0	8	0	4(1)	0	0	0	0	0(0)
7	0	0	3	0	4(0.4)	0	0	0	0	0(0)
8	0	0	0	0	0(0)	0	0	0	0	0(0)
9	0	0	0	0	0(0)	0	0	0	0	0(0)
10	0	0	0	0	0(0)	0	0	0	0	0(0)
11	0	0	0	0	0(0)					
12	0	0	0	0	0(0)					
13	0	0	0	0	0(0)					
14	0	0	2	0	0(0)					
15	0	0	0	0	0(0)					
16	0	0	0	0	0(0)					
17	0	0	0	0	0(0)					
18	0	0	0	0	0(0)					
19	0	0	0	0	0(0)					
20	0	0	0	0	0(0)					
TOTAL	0	1	142	1	59(6)	0	0	2	0	1(0.3)

Below 1.2 m, the deposits were a brown-dark brown (10YR 4/3), silty clay loam that was inferred to be an older alluvial fill, perhaps the Fort Hood alluvium (Nordt 1992) or a substantially finer textured (more distal overbank facies) deposit of the West Range alluvium. A very small amount of burned rocks, flakes, and snails were observed in the top 40 cm, but almost no cultural material was observed below that depth in the trench walls.

The second trench (BT 2) was situated fully upon the terrace surface to the southwest of BT 1. Two fills were inferred to be present in this trench. The upper fill, presumably the Ford or West Range alluvium, extended to a depth of 160 cmbs and consisted of yellowish brown (10YR 5/4) to very dark gray (10YR 3/1) loamy overbank sediment within which an A-AB-Bk soil had formed. Below 1.6 m, the alluvium was finer textured, and appeared to be slightly more rubified. Near the base of the trench these sediments yielded field textures of sandy loam and loam and fined upward to a silty clay loam. A 2Bk-2B(t?)k-2BC soil profile was formed within these deposits and suggest that these sediments may correlate with the Fort Hood alluvium.

The third trench (BT 3) was situated on a lower alluvial surface (T_{1B}) that lay adjacent to the Table Rock Creek channel immediately southeast of the site. This trench encountered a significantly coarser alluvial fill that consisted of three normally graded alluvial deposits. The basal portions of these deposits were typically composed of sand and graded into a loam or sandy loam. A weak A-AB-Bk soil was observed within these sediments. The stratigraphic position, internal variability, and prevalent 10YR hues suggest that this fill correlates with the Ford alluvium (Nordt 1992), although it is conceivable that these sediments may be of West Range age. No cultural material was observed in this trench.

Trench 5 was placed between BTs 1 and 3 on the sloping surface between T_{1A} and T_{1B}, and yielded sediments similar to those observed in BT 1. Three alluvial fills were inferred to be present in this trench. The top 40 cm consisted of a dark grayish brown (10YR 4/2) to very dark grayish brown (10YR 3/2) loam to sandy loam which was somewhat disturbed and classified as an Ap horizon formed within the Ford alluvium. Between 40 cmbs and approximately 220 cmbs, another alluvial fill was inferred to be present. This deposit graded from a loamy sand near the base of the unit to a loam or silty clay loam, and an 2Ab-2AB-2Bk soil was observed within this deposit. The color, texture and degree of carbonate development suggests that this deposit may correlate with the West Range alluvium. It rested unconformably upon a dark yellowish brown (10YR 4/4) loam which was inferred to be a 3Bk horizon formed within the Fort Hood alluvium. As with most of the trenches at this site, no cultural material was observed within the trench walls.

Test pit 1 was placed between the southwest ends of BT 1 and BT 5. Within the upper 20 cm of TP 1, large numbers of flakes and burned rocks and mussel shell fragments were found, and a piece of brown bottle glass was also recovered from the upper 10 cm. These two upper levels appeared to be disturbed by vegetation clearing. A moderate density of flakes and burned rocks and a few mussel shell fragments were found from 20 to 30 cmbs. Artifact frequencies declined with depth from 20 to 70 cmbs. The remainder of the levels excavated (70 to 200 cmbs) were virtually devoid of cultural material.

Test pit 2 was placed between BT 2 and BT 5. Within TP 2, total cultural items recovered included a flake and a burned rock from the upper 10 cm, a flake from 10 to 20 cmbs, and a burned rock from 30 to 40 cmbs. No cultural material was found from 20 to 30 cmbs or 50 to 100 cmbs. Vegetation clearing also appeared to have disturbed the upper 20 to 30 cm within this test pit.

The nondebitage lithic assemblage from the site consists of one late stage biface of indeterminate white chert. A moderate amount of debitage, consisting of seven identified chert types and six indeterminate chert categories, was also recovered

(Table 6.163). The identification rate was a relatively low 11%. As a result, indeterminates occurred in greater than expected frequency and all identified types occurred in less than expected frequency. Exclusion of the indeterminates resulted in all types occurring within the expected range (Table 6.164).

All four chert provinces are represented in the small identified assemblage. The most common type is Anderson Mountain Gray, which is the only West Fort type and comprises 31% of the identified total. North Fort is represented by Fort Hood Yellow and Owl Creek Black, which together comprise 38% of identified specimens. The Cowhouse province is represented by Cowhouse Mottled, Table Rock Flat, and (presumably) Heiner Lake Translucent Brown (which also occurs in the Southeast Range and may in fact represent procurement from that province), and comprises 25% of the identified total. Because the Heiner Lake Translucent Brown is presumed to be a Cowhouse province material here, Southeast Range is represented by one flake of Heiner Lake Blue (6%).

The recovered debitage occurs in primarily small to medium size grades, with a modal peak between 0.9 and 1.2 cm, and 88% of the assemblage is decortified. Therefore, it appears that primarily

Table 6.163 Debitage Recovery by Size and Material Type, AU 1, 41CV1116.

	Size (cm)					
Lithic Material	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types						
03-AM Gray	0	3	1	1	0	5
08-FH Yellow	0	3	1	0	0	4
09-HL Tr Brown	0	0	0	2	0	2
10-HL Blue	1	0	0	0	0	1
17-Owl Crk Black	1	1	0	0	0	2
18-C Mottled	0	0	0	1	0	1
28-Table Rock Flat	0	0	1	0	0	1
Subtotal	*2*	*7*	*3*	*4*	*0*	*16*
Unidentified Types						
Indet Dk Brown	6	5	0	1	0	12
Indet Dk Gray	2	4	4	4	0	14
Indet Lt Brown	6	22	14	1	1	44
Indet Lt Gray	12	8	0	3	2	25
Indet Misc.	5	1	0	5	0	11
Indet White	1	14	4	3	0	22
Subtotal	*32*	*54*	*22*	*17*	*3*	*128*
Total	**34**	**61**	**25**	**21**	**3**	**144**

Table 6.164 Binomial Statistic Results, AU 1, 41CV1116.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
03-AM Gray	5	10	26	less	0	5	expected
08-FH Yellow	4	10	26	less	0	5	expected
09-HL Tr Brown	2	10	26	less	0	5	expected
10-HL Blue	1	10	26	less	0	5	expected
17-Owl Crk Black	2	10	26	less	0	5	expected
18-C Mottled	1	10	26	less	0	5	expected
28-Table Rock Flat	1	10	26	less	0	5	expected
Total Indet	128	10	26	more	na	na	na

latter-stage reduction is represented. Abraded cortical flakes outnumber unabraded cortical flakes, suggesting that at least some of the early-stage reduction was conducted on stream-procured cobbles (Table 6.165).

Faunal recovery was limited to a single fragment of an indeterminate bone from a deer-sized animal. Despite the low recovery, it evinced clear charring, indicating that it does represent the remains of human subsistence.

6.21.3 Conclusions and Recommendations

At least two and perhaps three alluvial fills are represented at the site. These fills appear to include the Ford and West Range units, and may include the Fort Hood alluvium. The terrace surfaces appear to have been affected by plow disturbance. Most cultural material at the site is confined to the uppermost levels of the fills.

Based on the excavation results, buried cultural material appears to be limited to the area between TP 1 and TP 2. Although cultural material was recovered from 0 to 20 cmbs in each pit, the fill within the upper 20 cm (and, perhaps, slightly deeper) has been disturbed by vegetation clearing or other activities. The artifact distribution implies a possible occupation from 20 to 70 cmbs. However, the cultural material in this zone within TP 1 may represent spatially limited cumulic or palimpsest remains. Artifact recovery below 70 cmbs in TP 1 and the absence of cultural materials in trench profiles strongly imply that artifact densities at depth are so low that possible occupations are not likely to reach artifact densities needed for an analysis of discrete hunter-gatherer occupations (cf. Ellis 1994a). This, along with the fact that no features were located despite extensive exposures within a very small site, suggests that 41CV1116 therefore has negligible potential to provide significant data for problems delineated in the research design for Fort Hood (Ellis 1994b). On this basis, we judge 41CV1116 to be ineligible for inclusion in the NRHP and recommend no further management for the site.

Table 6.165 Debitage Cortex Characteristics by Material Type, AU 1, 41CV1116.

	Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types						
03-AM Gray	0	0	1	4	0	5
08-FH Yellow	0	0	0	4	0	4
09-HL Tr Brown	0	0	0	0	2	2
10-HL Blue	0	0	0	1	0	1
17-Owl Crk Black	0	0	0	2	0	2
18-C Mottled	0	0	0	1	0	1
28-Table Rock Flat	0	0	0	1	0	1
Subtotal	*0*	*0*	*1*	*13*	*2*	*16*
Unidentified Types						
Indet Dk Brown	0	0	1	11	0	12
Indet Dk Gray	0	0	0	14	0	14
Indet Lt Brown	0	2	4	36	2	44
Indet Lt Gray	0	0	0	25	0	25
Indet Misc.	4	1	1	5	0	11
Indet White	0	0	0	22	0	22
Subtotal	*4*	*3*	*6*	*113*	*2*	*128*
Total	**4**	**3**	**7**	**126**	**4**	**144**

6.22 SITE 41CV1136

6.22.1 Introduction

In late December 1993, Mariah conducted test excavations at 41CV1136. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.22.1.1 Location and Description

Site 41CV1136 is located on the south side of Table Rock Creek. An unnamed tributary of Table

Rock Creek transects the site, and inset terraces of this tributary make up the central portion of the site (Figure 6.122). A tank trail forms the western boundary of the site (Figure 6.123). The site contains seven burned rock features, including a burned rock midden. Maximum site dimensions are 140 m x 140 m (about 19,600 m^2, or 4.8 acres). For purposes of this report, the site is considered a member of the Table Rock site group.

6.22.1.2 Previous Work

This site was recorded by Masson and Dureka on 14 August 1985. The site was noted as containing burned rock mounds and concentrations and a lithic scatter at the eastern edge. A low density of burned rock, mussel shell, debitage, and bifaces was observed. A Frio dart point was collected from the surface of the site. Based on exposures in vandal pits and eroded areas, the site was noted as containing greater than 1 m of loam deposits. The site was estimated to be 40% disturbed by vandalism, erosion, and tracked vehicles.

Frederick, Abbott, and Quigg revisited the site in January 1992 and reevaluated the site based on archeological and geomorphic observations. A burned rock midden was observed eroding into a tank trail at the western edge of the site. Because the site had the potential to contain intact cultural deposits, 22 shovel tests were excavated, 16 of which (73%) yielded positive results. A total of 222 cultural items were recovered from these shovel tests at depths up to 80 cmbs. The results of shovel testing suggested that the site had good archeological research potential. However, the eligibility status of the site remained uncertain. Therefore, the site was recommended for avoidance or for formal testing if avoidance was not possible. Six to eight 1 x 1 m of manually excavated test pits and five to seven backhoe trenches were recommended for formal eligibility testing (Trierweiler 1994:A1271-A1273).

6.22.1.3 New Work

Six backhoe trenches (BTs 1 through 6) and seven 1 x 1 m test pits (TPs 1 through 7) were excavated on the site (Table 6.166). Trenches 1 through 4 were excavated on the T_1 surface south of the tributary, and BT 5 and BT 6 were excavated on the T_1 surface north of the tributary. Test pits 1 and 2 were offset from BT 4 and BT 1, respectively. Test pits 3 and 5 were excavated as isolated units on the T_1 surface north of the tributary. Test pits 4, 6, and 7 were excavated as isolated units on the T_0 surface. Recovered cultural material is summarized in Table 6.167.

Six subsurface features (Fs 1 through 6) were identified from backhoe trenches, test pits, and cutbank exposures. The burned rock midden described by Quigg during earlier work was reclassified as a burned rock concentration and was designated F 7.

6.22.2 Results

The preliminary results of backhoe trenching suggest that the site is composed of at least three allostratigraphic units exhibiting relatively complex architectural relationships. Because depositional units of differing ages are distributed in fairly discrete areas of the site, the site was subdivided into three analytical units. Analytical unit 1 consists of excavations on the T_1 terrace south of the inset tributary valley, AU 2 consists of the inset tributary deposits (T_0), and AU 3 consists of the higher terrace north of the tributary. Each of these areas is addressed separately below.

6.22.2.1 Excavations in the Southern T_1 Terrace

Four trenches (BTs 1 through 4) were placed on the T_1 surface south of the tributary, and exposed differing facies of the oldest alluvial fill which included channel gravels and brown (10YR 5/3) to yellowish brown (10YR5/6) loamy, sandy, and clayey overbank facies. It is interpreted as Fort Hood alluvium capped in places by a thin to moderate drape of more recent overbank alluvium.

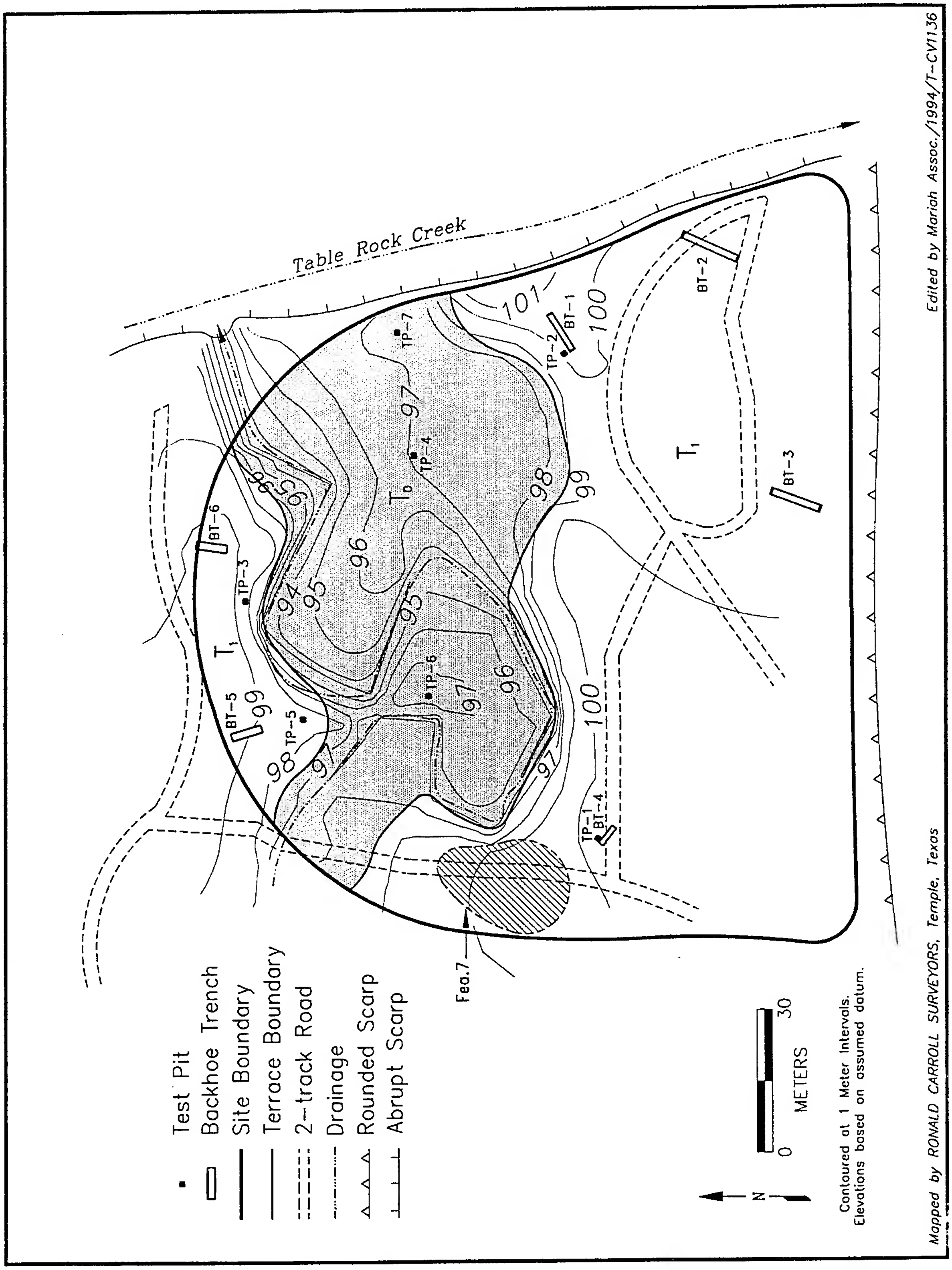

Figure 6.122 Site Map of 41CV1136.

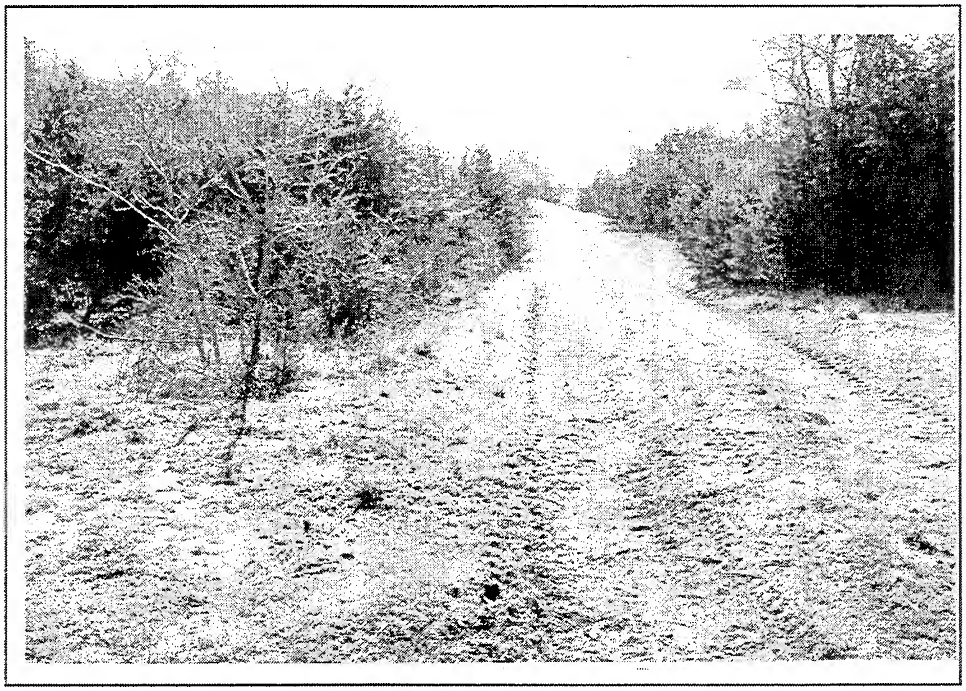

Figure 6.123 Overview of Site 41CV1136 Showing Tank Trail Marking the Western Site Boundary, Looking South.

Trench 1 was situated on the front of the terrace near the scarp leading to the T_0 surface. It was excavated to a depth of approximately 420 cm and revealed a thick accumulation of sandy loam exhibiting an A-AB-Bk-C profile (Figure 6.124). Two zones of cultural material were observed in the trench, including a relatively dense burned rock concentration (F 1) from 30 to 50 cmbs, and a zone of sparse, dispersed burned rock at approximately 200 cmbs. The thickness of the A horizon thinned considerably away from the modern stream, suggesting that it represents a more recent alluvial drape.

Test pit 2 was offset from BT 1, over F 1, and excavated to 220 cmbs. A few flakes and several burned rocks were found from 0 to 20 cmbs. The top of F 1 was encountered at 18 cmbs within an A horizon, and the base was reached at 52 cmbs within an AB horizon. The overall dimensions of F 1 were not determined, as the feature extended to the west an unknown distance beyond the trench and test pit. However, at least 6 m of the feature

Table 6.166 List of Treatment Units, 41CV1136.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cm)
1	BT 1	12	0.8	430
1	BT 2	12	0.8	420
1	BT 3	11	0.8	370
1	BT 4	6	0.8	230
1	TP 1	1.1	0.9	170
1	TP 2	1.0	1.0	220
2	TP 4	1.0	1.0	150
2	TP 6	1.0	1.0	50
2	TP 7	1.0	1.0	200
3	BT 5	6	0.8	310
3	BT 6	7	0.8	320
3	TP 3	1.0	1.0	310
3	TP 5	1.0	1.0	220

Table 6.167 Artifact Recovery by Test Pit, 41CV1136.

	TEST PIT 1					TEST PIT 2					TEST PIT 3				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	0	0	0(0)	0	0	2	0	4(0.4)	0	0	0	0	5(0.9)
2	0	0	0	0	0(0)	0	0	4	0	21(2)	0	0	0	0	11(2.5)
3	0	0	0	0	0(0)	0	0	4	0	235(33)	0	0	0	0	6(1)
4	0	0	0	0	0(0)	0	0	1	1	340(105)	0	0	0	0	10(1)
5	0	0	0	0	1(0.1)	0	0	3	0	20(6)	0	0	1	0	51(3.5)
6	0	0	0	0	1(0.5)	2	0	0	0	7(0.5)	0	0	1	0	156(16)
7	0	0	4	1	4(0.7)	0	0	0	0	6(1)	0	0	4	1	175(14.5)
8	0	0	3	1	3(0)	0	0	1	0	0(0)	1	0	1	1	25(2)
9	0	0	2	0	0(0)	0	0	0	0	5(1)	0	0	5	0	10(1)
10	0	0	2	0	0(0)	0	0	0	0	4(0.5)	0	0	1	0	5(0.9)
11	0	0	1	0	2(0.3)	0	0	0	0	0(0)	0	0	1	1	3(0.9)
12	0	0	10	0	6(0.5)	0	0	0	0	0(0)	0	0	3	0	3(0.9)
13	0	0	5	0	115(42)	0	0	0	0	0(0)	0	2	6	0	15(1)
14	0	0	1	0	0(0)	0	0	0	0	0(0)	0	0	3	0	7(0.9)
15	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	1	0	3(0.9)
16	0	0	1	0	0(0)	0	0	0	0	0(0)	0	0	2	0	0(0)
17	0	0	0	0	3(0.9)	0	0	0	0	0(0)	0	0	0	0	2(0.9)
18						0	0	0	0	0(0)	0	0	0	0	0(0)
19						0	0	0	0	0(0)	0	0	2	0	1(0.2)
20						0	0	0	0	0(0)	0	0	0	0	0(0)
21						0	0	0	0	0(0)	0	0	0	0	0(0)
22						0	0	0	0	0(0)	0	0	0	0	0(0)
23											0	0	0	0	0(0)
24											0	0	0	0	0(0)
25											0	0	0	0	0(0)
26											0	0	0	0	0(0)
27											0	0	0	0	0(0)
28											0	0	0	0	0(0)
29											0	0	0	0	0(0)
30											0	0	0	0	2(0.9)
31											0	0	0	0	0(0)
TOTAL	0	0	29	2	133(44.4)	2	0	15	1	642(149.4)	1	2	31	3	490(49.9)

	TEST PIT 4					TEST PIT 5					TEST PIT 6					TEST PIT 7				
LEVEL	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	0	0	0(0)	0	0	3	0	1(0)	0	0	3	0	7(0.5)	0	2	1	0	1(0.2)
2	0	0	2	0	0(0)	0	0	5	0	7(0)	0	0	6	0	300(25)	0	3	1	0	0(0)
3	0	0	0	0	5(1)	0	0	3	0	0(0)	0	0	0	0	190(17)	0	0	0	0	1(0.2)
4	0	0	0	0	2(0)	0	0	0	0	3(0)	0	0	0	0	70(12)	0	0	0	0	3(0.3)
5	0	0	0	0	5(0.5)	0	0	0	0	4(0.2)	0	0	0	0	3(17)	0	0	0	0	12(0.8)
6	0	0	0	0	2(0.3)	0	0	10	0	2(0)						0	8	3	0	7(0.5)
7	0	0	0	0	0(0)	0	0	19	4	12(1)						0	5	2	0	2(0.1)
8	0	0	0	0	1(0.1)	0	0	2	0	7(0.5)						0	0	0	0	1(0.1)
9	0	0	0	0	3(0.8)	0	0	1	0	21(9)						0	0	1	0	4(0.3)
10	0	0	1	0	1(0.1)	0	0	4	1	0(0)						0	0	1	0	4(0.3)
11	0	0	0	0	0(0)	0	0	26	5	14(0.9)						0	0	2	0	3(0.1)
12	0	0	0	0	0(0)	0	0	16	0	5(1)						0	0	0	0	6(0.5)
13	0	0	0	0	0(0)	0	0	1	0	33(7)						0	0	1	0	6(0.3)
14	0	0	0	0	0(0)	0	0	1	0	13(1.5)						1	0	0	0	2(0.1)
15	0	0	0	0	0(0)	0	0	1	0	0(0)						0	0	0	0	2(0.3)
16						0	0	1	0	7(1)						0	0	2	0	2(0.1)
17						0	0	1	0	2(0.2)						0	0	0	0	0(0)
18						0	0	0	0	4(0.9)						0	0	0	0	0(0)
19						0	0	0	0	1(0.5)						0	0	0	0	0(0)
20						0	0	1	0	0(0)						0	0	0	0	0(0)
21						0	0	0	0	0(0)										
22						0	0	0	0	0(0)										
TOTAL	0	0	3	0	19(2.8)	0	0	95	10	16(23.7)	0	0	9	0	570(71.5)	1	18	14	0	56(4.2)

was exposed in the walls of BT 1, suggesting that it is a fairly extensive concentration. Within the test pit, 595 burned rocks (144 kg) were recovered from feature context. The vast majority of rock was recovered from the central 20 cm of the feature, with low densities found above and below. Approximately 90% of the rocks were angular, with 10% tabular. The majority of rocks (60%) were 4 to 9 cm in size, while 35% were 1 to 4 cm in diameter, and only 5% were 9 to 15 cm in size. No rocks larger than 15 cm in maximum dimension were recovered. No internal patterning or charcoal flecking was observed within the feature. Artifact recovery from the feature included several flakes and a few mussel shells. Artifact density decreased dramatically below F 1 from 50 to 100 cmbs, with only several burned rocks, a flake, and a bone fragment found therein. No cultural material was found from 100 to 220 cmbs, despite the fact that dispersed burned rocks

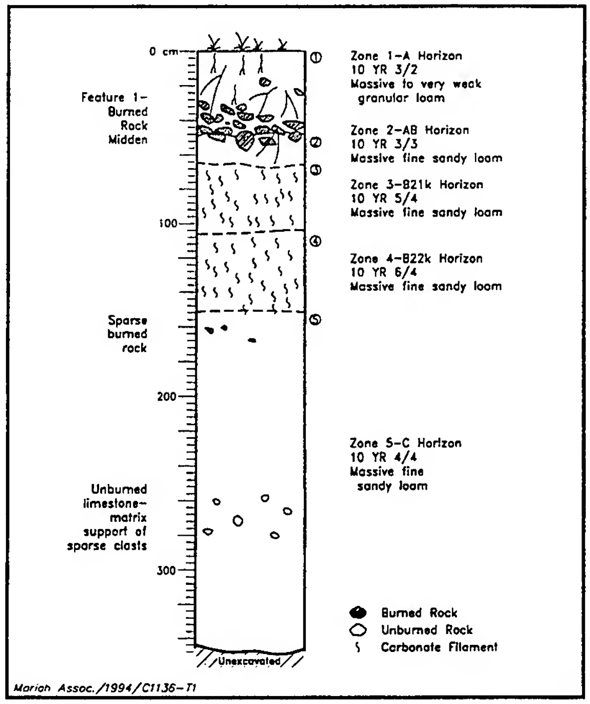

Figure 6.124 Measured Section, BT 1, 41CV1136.

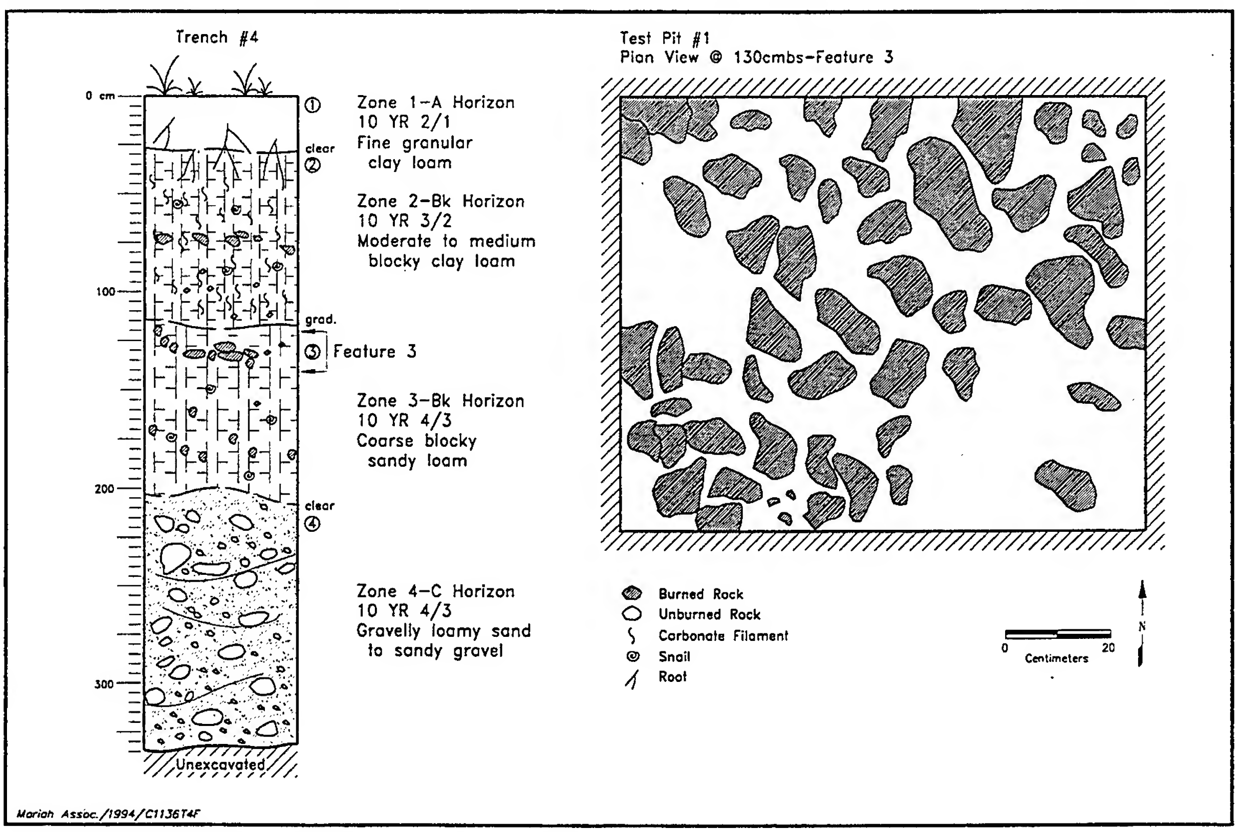

Figure 6.125 Measured Section, BT 4, and Plan of F 3 (130 cmbs), TP 1, 41CV1136.

had been observed about 200 cmbs in the profile of BT 1.

Trench 2 was situated farther back on the terrace toward the valley wall. It was excavated to a depth of approximately 425 cmbs and consisted of a surficial loam that graded down into a sandy clay loam and finally into a clay loam at approximately 375 cmbs. Like BT 1, BT 2 exhibited an A-AB-Bk-C profile; however, structural development in the B horizon was slightly stronger, probably as a result of the finer texture. No cultural material was detected in BT 2.

Trench 3 was situated at the rear of the T_1 terrace next to the colluvial toeslope. It extended to a depth of 420 cm and exhibited an A-Bw-Bk profile developed in clay loam and clay. Unlike the previous two trenches, carbonate filaments extended to the base of the trench, probably reflecting a slower rate of percolation through the finer sediments. Other than a few sparse burned limestone clasts present at approximately 90 cmbs, no cultural material was detected.

Trench 4 was situated on the margin of the tributary valley away from Table Rock Creek and about 8 m south of F 7. This trench was excavated to a depth of approximately 330 cmbs and consisted of approximately 2 m of sandy to loamy overbank fines resting on a thick deposit of channel gravels (Figure 6.125). The fines exhibited an A-Bk profile and relatively strong structural development. Dispersed cultural material was present throughout the fine-grained top stratum, and distinct strata of burned rock and mussel shell were observed at 70 to 80 cmbs, 110 to 130 cmbs, and 170 to 190 cmbs.

Test pit 1 was offset from BT 4 and excavated to 170 cmbs. No cultural material was found in the upper 50 cm of the test pit. Recovery from 50 to 120 cmbs included a few flakes and burned rocks from 50 to 80 cmbs and 100 to 120 cmbs. In addition, a mano was found from 70 to 80 cmbs. Stratigraphic similarity suggests that the cultural material found from 50 to 80 cmbs may be a buried portion of F 7, which is exposed in the erosionally beveled edge of the surface a few meters to the north and northwest. The feature consists of a concentration of angular burned rocks approximately 20 to 30 cm thick and has exposed dimensions of approximately 20 m by 15 m. However, only part of the feature is exposed by erosional beveling, and the few burned rocks and lithics found between 50 and 80 cmbs may represent a buried edge of the feature.

Feature 3, a burned rock pavement, was encountered from 118 to 130 cmbs in TP 1 (see Figure 6.125). It was composed of a 12 cm thick pavement of burned rock that covered the entire test pit and extended into the north wall (Figure 6.126). The feature did not extend east or west of the limits of the pit or in the trench wall, suggesting that the majority of the feature was excavated. A total of 115 burned rocks (42 kg), averaging 10 cm x 8 cm, and a few flakes were recovered from the feature. No charcoal was observed within the feature fill. Only a few flakes were found below F 3.

Two middle stage bifaces and a limestone mano came from AU 1. One of the bifaces is of distant Southeast Range Heiner Lake Tan chert. A limited suite of debitage, including four identified chert types and five indeterminate chert categories, was also recovered (Table 6.168). Overall, approximately 14% of the assemblage was identified. When the entire assemblage was considered, the indeterminates occurred in greater than expected frequency and all identified types occurred in less than expected frequencies. When the indeterminates were excluded, all types occurred in the expected range (Table 6.169).

Two chert provinces are represented in the identified fraction of the debitage from AU 1. The majority of flakes (83%) are North Fort types (Fort Hood Yellow, Gray/Brown/Green, and Owl Creek Black), while the Cowhouse province is represented by one flake of Cowhouse Striated. Eighty-two percent of the assemblage is smaller than 1.8 cm, but only 73% is clearly noncortical,

Figure 6.126 Feature 3, 41CV1136, Looking North-northeast.

suggesting that some initial reduction of relatively small cobbles was performed. While none of the cortical flakes were clearly stream-abraded, 75% were indeterminate, suggesting that some stream procurement is possibly represented (Table 6.170).

Although no radiocarbon ages were obtained from AU 1, a suite of eight *Rabdotus* snails were collected and analyzed for A/I ratios from TP 1, Level 15 (approximately 20 cm below F 3). These specimens yielded ratios between 0.108 and 0.402 (see Appendix D), which regress to radiocarbon-equivalent ages between approximately 4500 and 18,300 years BP. Five of these snails clustered with ratios between 0.108 and 0.125. These five snails were used to calculate an average radiocarbon-equivalent age for the deposits of approximately 4950 BP. This age is consistent with the waning stages of the Fort Hood fill event (Nordt 1992), and suggests that F 3 is probably of Middle Archaic age.

<u>6.22.2.2 Excavations in the Tributary T_0 Surface</u>

Because the isolated T_0 surface was inaccessible to the backhoe, no trenching was performed in AU 2. However, one exposure of the T_0 fill was recorded from a natural cutbank on the margin of the tributary channel. It consisted of 1.4 m of very dark (10YR 3/2) to dark grayish brown (10YR 4/2) massive sandy loam containing thin, lenticular sandy beds (Figure 6.127). Below 140 cmbs, the sediments consisted of imbricated channel gravels associated with the tributary. The unit exhibited a thick, cumulic A-C soil profile. No cultural material was exposed in the profile, but a dense burned rock concentration was observed at the top of the fill a few meters away. The entire unit was interpreted as Ford alluvium in the field, although a radiocarbon age obtained from a feature in the fill suggests that some of the sediments in the valley may actually represent upper West Range alluvium.

Feature 4 is a 30 cm thick burned rock concentration contained in the tributary fill (Figure 6.128). A 4.5 m long portion of the feature was exposed in a cutbank of the meander near the center of the site, indicating that it has been laterally truncated by cutbank erosion on both the upstream and downstream sides of a narrow meander neck. Currently, the meander neck is only a few meters wide at the base and is experiencing relatively active erosion from both the upstream and downstream sides of the meander. Clearly, cutoff of the meander will occur in the next few years, destroying the remainder of F 4 in the process.

Test pit 6 was placed over F 4 on the narrow interfluve separating upstream and downstream segments of the meandering tributary and excavated to the base of the feature (50 cmbs). The top of F 4 was encountered at 7 cmbs. The feature extended into all of the test pit walls after excavation, sloping down toward the southeast. A total of 570 relatively small, angular burned rocks (55 kg) was recovered from the feature within TP 6. The density of burned rock decreased with depth. Recovery from the feature included a few flakes and charcoal flecks. Charcoal from Level 4 was submitted for radiocarbon analysis and yielded an age of 1310 ± 110 BP (Beta b-75162), suggesting that the fill is equivalent to the upper

Table 6.168 Debitage Recovery by Size and Material Type, AU 1, 41CV1137.

Lithic Material	Size (cm) 0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types						
08-FH Yellow	1	0	0	1	0	2
15-Gry/Brn/Grn	0	0	0	1	0	1
17-Owl Crk Black	0	2	0	0	0	2
26-C Striated	0	0	1	0	0	1
Subtotal	*1*	*2*	*1*	*2*	*0*	*6*
Unidentified Types						
Indet Dk Brown	1	0	0	0	0	1
Indet Dk Gray	0	1	0	0	0	1
Indet Lt Brown	9	9	9	5	1	33
Indet Lt Gray	0	1	1	0	0	2
Indet White	1	0	0	0	0	1
Subtotal	*11*	*11*	*10*	*5*	*1*	*38*
Total	**12**	**13**	**11**	**7**	**1**	**44**

Table 6.169 Binomial Statistic Results, AU 1, 41CV1136.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
08-FH Yellow	2	4	14	less	0	4	expected
15-Gry/Brn/Grn	1	4	14	less	0	4	expected
17-Owl Crk Black	2	4	14	less	0	4	expected
26-C Striated	1	4	14	less	0	4	expected
Total Indet	38	4	14	more	na	na	na

West Range of Nordt (1992). No internal patterning was recognized in the feature, which may be the result of bioturbation by dense root growth. Alternatively, the sloping base of the feature and lack of internal patterning may be the result of slumping or colluvial reworking of sediments and feature matrix from the higher T_1 surface. This would account for the disparity between the field estimate of the age of the sediments and the radiocarbon age obtained from the feature.

Test pit 4 was placed on a large, "moundlike" rise located on the south side of the tributary. The pit was excavated to 150 cmbs. Recovery from the test pit included a few flakes and or burned rocks found in each level excavated from 10 to 60 cmbs and from 70 to 100 cmbs. All other levels were culturally sterile.

Test pit 7 was placed on the south side of the tributary and just above Table Rock Creek. Within this test pit, a few scattered burned rocks and/or flakes were found in each level excavated from 0 to 160 cmbs. In addition, a few bone fragments were found from 0 to 20 cmbs, 50 to 70 cmbs, and 130 to 140 cmbs. No cultural material was recovered from 160 to 200 cmbs.

Table 6.170 Debitage Cortex Characteristics by Material Type, AU 1, 41CV1136.

	Partial Cortex				
Lithic Material	Unabraded	Indeterminate	No Cortex	Indetrminate	Total
Identified Types					
08-FH Yellow	1	0	1	0	2
15-Gry/Brn/Grn	0	0	1	0	1
17-Owl Crk Black	0	0	2	0	2
26-C Striated	0	0	1	0	1
Subtotal	*1*	*0*	*5*	*0*	*6*
Unidentified Types					
Indet Dk Brown	0	0	1	0	1
Indet Dk Gray	0	0	1	0	1
Indet Lt Brown	2	5	24	2	33
Indet Lt Gray	0	2	0	0	2
Indet White	0	0	1	0	1
Subtotal	*2*	*7*	*27*	*2*	*38*
Total	**3**	**7**	**32**	**2**	**44**

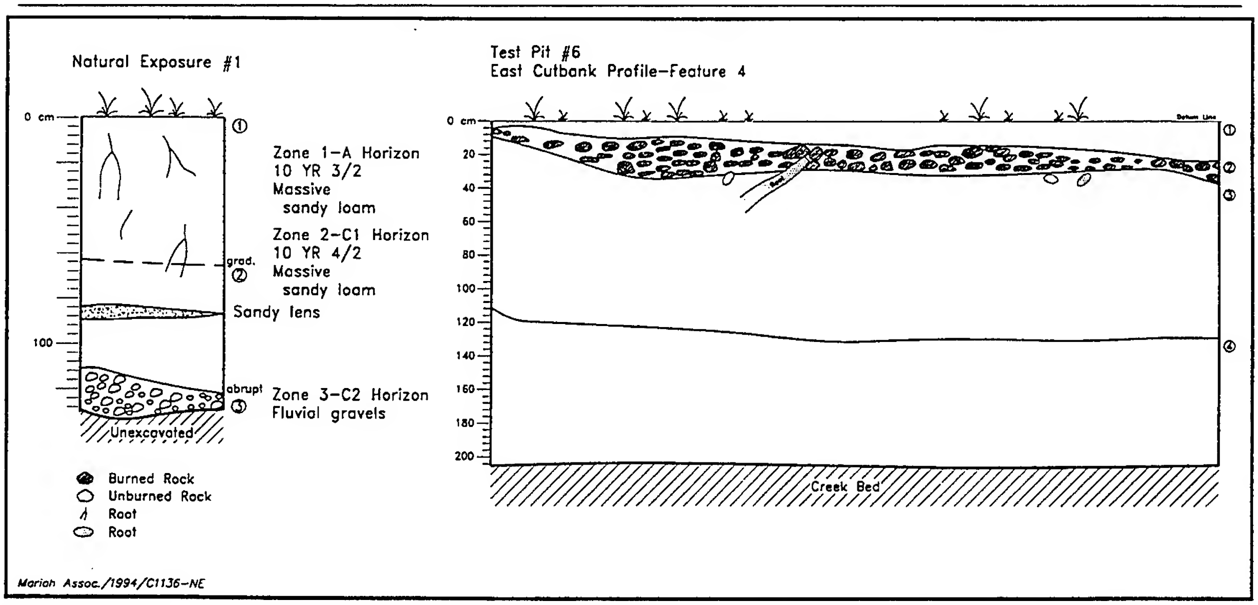

Figure 6.127 Measured Section, T0 Cutbank, and East Cutbank Profile of F 4, 41CV1136.

No tools were recovered from AU 2, and no lithic debitage was recovered that represent any of the recognized chert types. The few lithics recovered ranged in size from 0.5 cm to 5.2 cm, with 88% smaller than 1.8 cm. Decortified flake made up 88% of the total, while only one of the three cortical flakes was clearly stream-abraded.

6.22.2.3 Excavations in the Northern T_1 Terrace

Two backhoe trenches and two isolated test pits were excavated in AU 3. In BT 5, two distinct alluvial units were preserved in the profile (Figure 6.129). The upper part of the profile consisted of approximately 110 cm of dark grayish brown (10YR 4/2) sandy loam underlain by a lenticular sandy gravel channel facies that achieved a maximum thickness of 30 cm. The surface exhibited an A-C profile, and a clear zone of burned limestone clasts was present 45 to 55 cmbs. The material is tentatively interpreted as relatively old Ford alluvium or upper West Range alluvium deposited as the tributary began to incise into the underlying deposits. Below 140 cmbs, the sediments in BT 5 consisted of grayish brown (10YR 5/2) to dark grayish brown (10YR 4/2) sandy clay loam exhibiting a moderate blocky structure and abundant carbonate filaments, both of which decreased in expression with depth. Overall, the trench exhibited an A-C-2Bk profile and was 3 m deep. Based on its grayer color, the lower fill probably represents a different age of sediment than the material exposed south of the tributary, and is tentatively identified as the West Range fill.

Trench 6 (see Figure 6.128) was situated in a similar location and exhibited a similar profile. Rather than a gravelly channel, the contact between the overlying Ford/upper West Range alluvium and underlying West Range alluvium was marked by a dipping, gravel-mantled truncation surface. The upper fill consisted of very dark grayish brown (10YR 3/2) gravelly clay loam, and also contained several internal gravelly truncation surfaces. The lower unit consisted of moderate, blocky-structured, dark grayish brown (10YR 4/2) sandy clay loam that graded down into yellowish brown

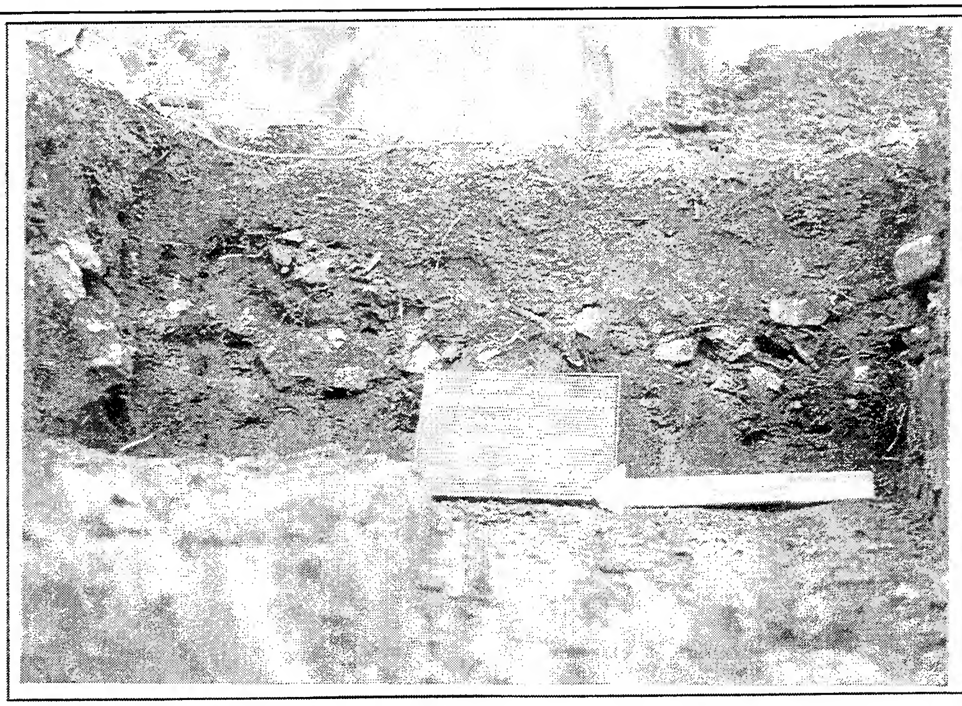

Figure 6.128 Feature 4, 41CV1136, Looking East.

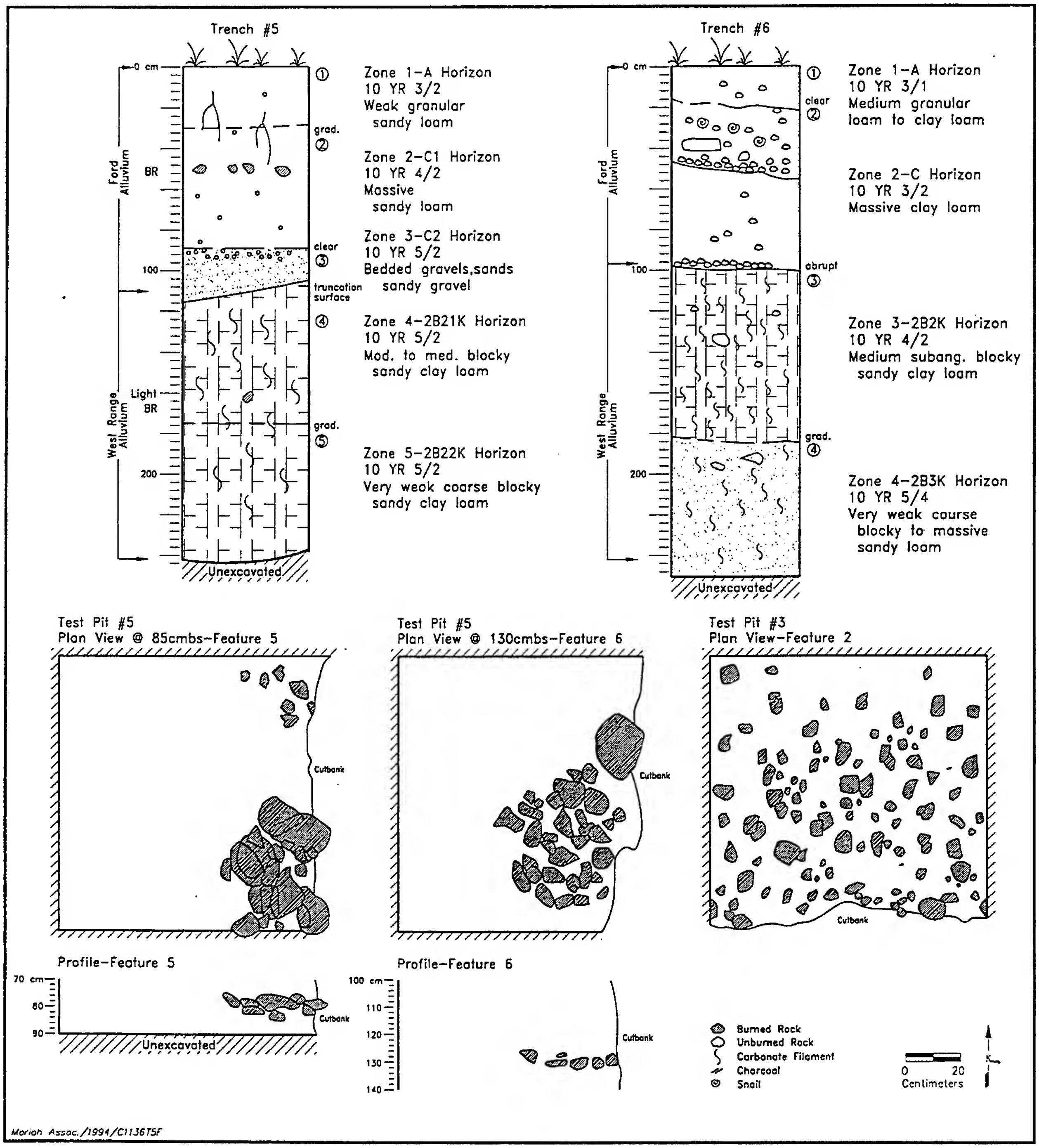

Figure 6.129 Measured Sections, BTs 5 and 6, Plans and Profiles of F 5 (85 cmbs) and F 6 (130 cmbs), TP 5, and Plan of F 2 (80 cmbs), TP 3, 41CV1136.

(10YR 5/6) sandy loam with depth. The overall thickness of the trench profile was approximately 3 m, and it exhibited an A-C-2B2k-2B3k profile. No cultural material was observed.

Test pit 3 was placed on the north cutbank of the tributary over an exposed burned rock midden (F 2) and excavated to 310 cmbs. Only scattered burned rocks were recovered from each level excavated from 0 to 40 cmbs in TP 3. The top of F 2 was encountered at 40 cmbs and the base was reached at about 82 cmbs. Feature 2 (see Figure 6.128) consisted of a 42 cm thick burned rock midden that extended into all of the walls of TP 3. A total of 407 burned rocks (36 kg) were recovered from a dark charcoal-stained matrix in the test pit. The vast majority of these rocks were small and angular, and ranged from 2 to 12 cm in size. The density of rock increased with depth. Within the feature, few flakes, an untyped dart point, a mussel shell, charcoal, and daub fragments were found. The feature has been disturbed by dense root growth and is currently eroding out of the tributary cutbank. A radiocarbon age of 1920 ± 80 BP (Beta b-75163) was obtained on charcoal from Level 8, near the base of the feature, suggesting that it is of Late Archaic age.

Below the feature, flakes, burned rocks, and more daub fragments were found from 80 to 90 cmbs. These fragments of daub may be by-products of a cooking technology. From 90 to 150 cmbs, several scattered burned rocks and a few flakes were found. In addition to these cultural materials, a Bulverde point was found from 100 to 110 cmbs and a couple of bone fragments were found from 120 to 130 cmbs. From 150 to 200 cmbs, low frequencies of flakes and burned rocks were recovered; however, a radiocarbon age of 2990 ± 60 BP was obtained on charcoal from Level 18 (170 to 180 cmbs). Except for a couple of burned rocks found from 290 to 300 cmbs, no cultural material was found from 200 to 310 cmbs. The field interpretation of the fill, coupled with the bracketing radiocarbon ages from the test pit, demonstrate that the Early Archaic Bulverde point is stratigraphically out of place, and probably represents an heirloom item picked up by the Late Archaic inhabitants.

Test pit 5 was also placed on the north cutbank of the tributary and was excavated to 220 cmbs. Again, a few scattered burned rocks and/or flakes were found in each level excavated from 0 to 50 cmbs. From 50 to 70 cmbs, flake counts increased sharply while the amount of burned rocks remained relatively low. The top of a hearth (F 5) was encountered at 73 cmbs and the base was reached at 86 cmbs. Feature 5 (Figure 6.130) consisted of a 51 cm by 35 cm circular slab-filled, basin-shaped hearth that has been partially eroded out of the tributary cutbank (see Figure 6.129). Within the hearth, 21 tabular and subangular rocks (9 kg) were recovered. The rocks appeared to have been placed along the contour of the basin and stacked two tiers thick around the edges and bottom of the basin. Charcoal was absent within the feature. Only a few flakes and scattered burned rocks were found adjacent to the hearth.

Below F 5, a few flakes were found from 90 to 100 cmbs. A peak in flake counts occurred from 100 to 110 cmbs. Several burned rocks and a Castroville point base were associated with this peak. Within the following level (110 to 120 cmbs), the frequency of artifacts began to diminish. The top of another hearth (F 6) was encountered at 121 cmbs and the base was reached at 133 cmbs. Feature 6 (see Figure 6.129) consisted of a 54 cm x 49 cm rock-lined, basin-shaped hearth that also had been partially eroded out of the tributary cutbank (Figure 6.131). Within this hearth, 33 small, subangular rocks (7 kg) with associated charcoal staining were recovered. The rocks were placed along the borders of the hearth, one tier thick on the edges and two tiers thick in the center. A flake and several bone fragments were found adjacent to the feature. Below F 6, several scattered burned rocks and a couple of flakes continued to be found to 150 cmbs. From 150 to 220 cmbs, an occasional flake and a few burned rocks were recovered.

Figure 6.130 Profile of F 5, 41CV1136, Looking Southeast.

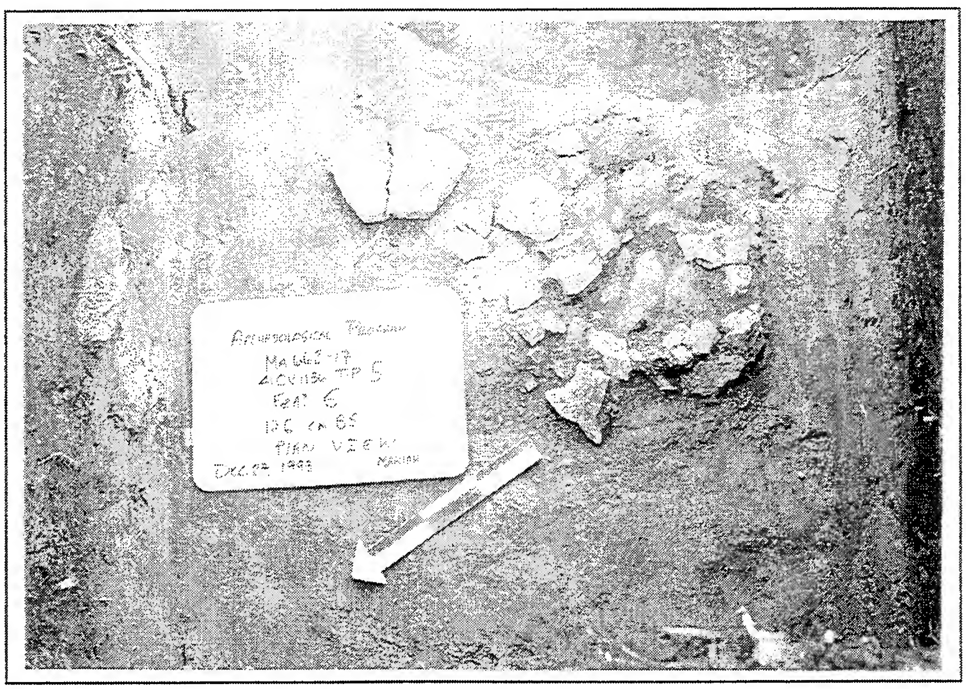

Figure 6.131 Planview of F 6, 41CV1136, Looking Southeast.

Including the untyped dart point from F 2, three projectile points were recovered from the excavations in AU 3 (Table 6.171). The Castroville point is consistent with the apparent Late Archaic age of the fill suggested by stratigraphy and radiocarbon data, while the Bulverde probably represents scavenging of an "heirloom" point by the Late Archaic inhabitants. None of the chert types represented by the points were identified. The nondebitage lithic assemblage consists of ten specimens, including a combination side and endscraper, seven bifacially modified tools, and two unifacial tools (Table 6.172).

Debitage representing ten identified chert types and eight indeterminate chert categories was recovered from AU 3 (Table 6.173). Roughly 18% of the assemblage was identified. When the entire assemblage was considered, the indeterminates occurred in greater than expected frequency, Cowhouse Dark Gray occurred in expected frequency, and the remainder of types occurred in less than expected frequency. Exclusion of the indeterminates provided little information, as all types occurred in expected frequency (Table 6.174).

Three of the four chert provinces are represented in the assemblage. The Cowhouse and North Fort provinces are the most strongly represented, with four types (Heiner Lake Translucent Brown, Cowhouse Mottled, Cowhouse Dark Gray, and Cowhouse Mottled/Flecked) comprising 43% of the identified total and four types (Fort Hood Yellow, Gray/Brown/Green, Owl Creek Black, and Fort Hood Gray) comprising 43% of the identified total, respectively. The Southeast Range is represented by two types (Heiner Lake Tan and Heiner Lake Blue) comprising 13% of the identified total. Although classed as a Cowhouse province chert because of the proximity of this source, it is also possible that the Heiner Lake Translucent Brown originated in the Southeast Range province.

A wide range of size classes occur in the assemblage, although the majority (83%) are smaller than 1.8 cm in size. Ninety percent of the total are decortified, suggesting that latter-stage reduction was predominant (Table 6.175).

A very small faunal assemblage was recovered from the excavation consisting of two indeterminate mammalian specimens and one specimen of Ambleminae mussel shell.

Table 6.171 Projectile Points, AU 2, 41CV1136.

	Point Type			
Lithic Material	Bulverde	Castroville	Other Dart	Total
Indet Dk Brown	1	1	0	2
Indet Dk Gray	0	0	1	1
Total	**1**	**1**	**1**	**3**

Table 6.172 Lithic Tools, AU 3, 41CV1136.

	Tool Type					
Lithic Material	complex scraper	late stage biface	preform	side scraper	uniface	Total
01-HL Blue(l)	0	0	0	0	1	1
02-C White	0	0	0	0	1	1
06-HL Tan	0	0	0	1	0	1
14-FH Gray	0	1	1	0	0	2
15-Gry/Brn/Grn	1	0	0	0	0	1
Indet Lt Brown	0	1	0	0	0	1
Indet Lt Gray	0	2	0	0	0	2
Indet Misc.	0	0	0	1	0	1
Total	**1**	**4**	**1**	**2**	**2**	**10**

6.22.2.4 Site Level Synthesis

Three allostratigraphic units, tentatively interpreted as the Fort Hood, West Range, and Ford fills, were detected on 41CV1136. The Fort Hood fill was limited to the T_1 surface south of the tributary valley. Although a possible thin drape of West Range alluvium was observed overlying the Fort Hood in a few locations to the south of the valley (e.g., BT 1), significant accumulations of the West Range fill were restricted to the north side of the tributary valley. Ford alluvium occupied the majority of the tributary valley and was also observed truncating the West Range on the northern margin of the small valley. Although a radiocarbon age from F 4 suggests that some West Range alluvium may also be present in the tributary valley, this material is tentatively interpreted as reworked from the higher surface.

The stratigraphic relationships between the three units suggest that the tributary exploited a lateral contact between the Fort Hood and West Range fills. This resulted in an inset strip of Ford alluvium in the narrow tributary valley separating the two major fills underlying the T_1 surface. Despite their obvious origin from Table Rock

Table 6.173 Debitage Cortex Characteristics by Material Type, AU 3, 41CV1136.

	Size (cm)							
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	Total
Identified Types								
06-HL Tan	0	0	0	1	0	0	0	1
08-FH Yellow	0	0	1	1	0	0	0	2
09-HL Tr Brown	0	0	0	0	0	1	0	1
10-HL Blue	0	0	0	1	0	1	0	2
14-FH Gray	0	0	1	0	0	0	0	1
15-Gry/Brn/Grn	0	0	0	1	0	2	1	4
17-Owl Crk Black	0	2	1	0	0	0	0	3
18-C Mottled	0	0	0	0	1	1	0	2
19-C Dr Gray	0	1	2	1	1	0	0	5
22-C Mott/Flecks	0	0	2	0	0	0	0	2
Subtotal	*0*	*3*	*7*	*5*	*2*	*5*	*1*	*23*
Unidentified Types								
Indet Black	1	1	0	0	0	0	0	2
Indet Dk Brown	0	2	4	6	2	0	0	14
Indet Dk Gray	0	0	0	1	0	0	0	1
Indet Lt Brown	0	15	16	37	6	4	0	78
Indet Lt Gray	0	3	0	0	0	0	0	3
Indet Mottled	0	0	0	0	0	0	1	1
Indet Trans	0	1	0	0	0	0	0	1
Indet White	0	2	1	0	0	0	0	3
Subtotal	*1*	*24*	*21*	*44*	*8*	*4*	*1*	*103*
Total	**1**	**27**	**28**	**49**	**10**	**9**	**2**	**126**

Table 6.174 Binomial Statistic Results, AU 3, 41CV1136.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
06-HL Tan	1	5	18	less	0	5	expected
08-FH Yellow	2	5	18	less	0	5	expected
09-HL Tr Brown	1	5	18	less	0	5	expected
10-HL Blue	2	5	18	less	0	5	expected
14-FH Gray	1	5	18	less	0	5	expected
15-Gry/Brn/Grn	4	5	18	less	0	5	expected
17-Owl Crk Blac	3	5	18	less	0	5	expected
18-C Mottled	2	5	18	less	0	5	expected
19-C Dr Gray	5	5	18	expected	0	5	expected
22-C Mott/Flecks	2	5	18	less	0	5	expected
Total Indet	103	5	18	more	na	na	na

Creek, the Fort Hood deposits showed a stronger tendency to fine with distance from the incised tributary valley rather than from the modern Table Rock Creek channel, suggesting that the former channel position once conformed roughly to the position of the modern tributary.

Burned rock was observed in several stratigraphic contexts, notably on a probable, but subtle, contact between the underlying Fort Hood fill and an overlying drape of West Range alluvium in AU 1. The materials at the contact (e.g., Fs 1 and 3) may therefore represent buried palimpsest assemblages dating from as early as the early part of the Middle Archaic to as late as the Late Prehistoric (Nordt 1992). A series of Late Archaic occupations appear to be represented by materials at varying depths in the West Range alluvium in TP 3 and TP 5, including Fs 2, 5, and 6. Feature 4, situated in the tributary alluvium, is a structureless accumulation of burned rock developed on a dipping paleosurface, and yielded a radiocarbon age considerably older than was predicted by the character of encasing sediments. Although it is possible that the tributary fill is older than its degree of soil development would suggest, it is tentatively interpreted as an older feature incorporated in more recent Ford sediments by slumping or collapse from the higher T_1 surface.

Artifact recovery from the site as a whole was relatively sparse, with the greatest return associated with AU 3. Faunal and mussel recovery was also low and showed similar trends. The only identified faunal taxon from the site was opossum.

Table 6.175 Debitage Cortex Characteristics by Material Type, AU 3, 41CV1136.

	All Cortex	Partial Cortex				
Lithic Material	Abraded	Abraded	Unabraded	Indeterminate	No Cortex	Total
Identified Types						
06-HL Tan	0	0	0	0	1	1
08-FH Yellow	0	0	0	0	2	2
09-HL Tr Brown	0	0	0	0	1	1
10-HL Blue	0	0	0	0	2	2
14-FH Gray	0	0	0	0	1	1
15-Gry/Brn/Grn	0	1	0	0	3	4
17-Owl Crk Black	0	0	0	0	3	3
18-C Mottled	0	1	1	0	0	2
19-C Dr Gray	0	0	0	0	5	5
22-C Mott/Flecks	0	0	0	1	1	2
Subtotal	*0*	*2*	*1*	*1*	*19*	*23*
Unidentified Types						
Indet Black	0	0	0	0	2	2
Indet Dk Brown	0	1	0	0	13	14
Indet Dk Gray	0	0	0	0	1	1
Indet Lt Brown	1	0	1	5	71	78
Indet Lt Gray	0	0	0	0	3	3
Indet Mottled	0	0	0	0	1	1
Indet Trans	0	0	0	0	1	1
Indet White	0	0	0	0	3	3
Subtotal	*1*	*1*	*1*	*5*	*95*	*103*
Total	**1**	**3**	**2**	**6**	**114**	**126**

6.22.3 Conclusions and Recommendations

With the possible exception of materials at the Fort Hood/West Range contact, occupations at this site are ephemeral and, therefore, likely to represent short-term behavioral episodes. Moreover, the site contains some preserved faunal remains that can be used for subsistence studies and snails that can be used for paleoenvironmental and paleoclimatic reconstruction. Consequently, the stratigraphy at the site contains a complex but valuable record of adaptively significant data that spans a long segment of the history of human occupation at Fort Hood. As a result, a long sequence of behavioral and environmental data sets can be examined in one place. This means that interpreting apparent patterns of behavioral stability or change at this site would be accompanied by a capacity to hold location constant. In short, this site has outstanding research potential according to the theoretical perspectives and research domains of the Fort Hood research design (Ellis et al. 1994). This potential includes a capacity to address early

and recent cultural components that are poorly understood in Central Texas.

On the basis of the foregoing, site 41CV1136 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because most known eligible components are relatively deeply buried, they are fairly well protected from training and other activities that affect only the surface of the site. However, adverse impacts from vehicles (as evidenced by extensive damage to F 7) still pose a substantial threat, especially to shallower materials (e.g., Fs 7 and 3). Impacts from heavy vehicles, especially if the ground is wet, could seriously affect shallow assemblages. Furthermore, possible terminal Late Prehistoric to protohistoric occupations are present in locations that have a very high likelihood of damage by the erosion processes that have exposed them, particularly F 4. Vandalism remains a threat because burned rock features are readily visible on the surface and in cutbank exposures. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, (2) prevent mechanical or manual excavations by military personnel, (3) minimize the impact of traffic, and (4) minimize the impact of cutbank erosion.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 280 m^2 in area. Known occupations occur at varying depths at the site in strata ranging from about 30 cm to about 100 cm thick. Some of the thinner occupations are stratigraphically separated by relatively thin layers of less valuable deposits. Assuming manual excavation of a 35 m^2 block near each test pit and F 7, a total of 225 to 250 m^2 of manual excavations may be necessary, depending on the extent to which manual excavations can be supplemented by carefully monitored mechanical excavations to remove overburden and unnecessary intervening deposits.

Because this site is a premier archeological resource on Fort Hood, larger-scale mitigation efforts at 41CV1136 may well yield extraordinarily robust data bases which could contribute quantum, rather than incremental, advances to our knowledge of Fort Hood prehistory. The above estimated mitigation volume should therefore be regarded as a minimum relative to the site's capacity to yield valuable information. Hence, we also recommend that any eventual mitigation at this site involve more excavation than the above estimate, and that it be pursued with the intent to acquire data sets that will become centerpieces for subsequent research at other sites on Fort Hood. Even at the current (1994) poor state of prehistory development on Fort Hood, large-scale mitigation would contribute substantially to resolution of general research issues for some time periods, thereby establishing a basis for making a transition to highly topic-specific historic contexts.

6.23 SITE 41CV1167

6.23.1 Introduction

In late February and early March 1994, Mariah conducted test excavations at site 41CV1167. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.23.1.1 Location and Description

Site 41CV1167 is situated on a colluvial toeslope and terrace at a confluence of drainages in the upper reaches of Stampede Creek (Figure 6.132).

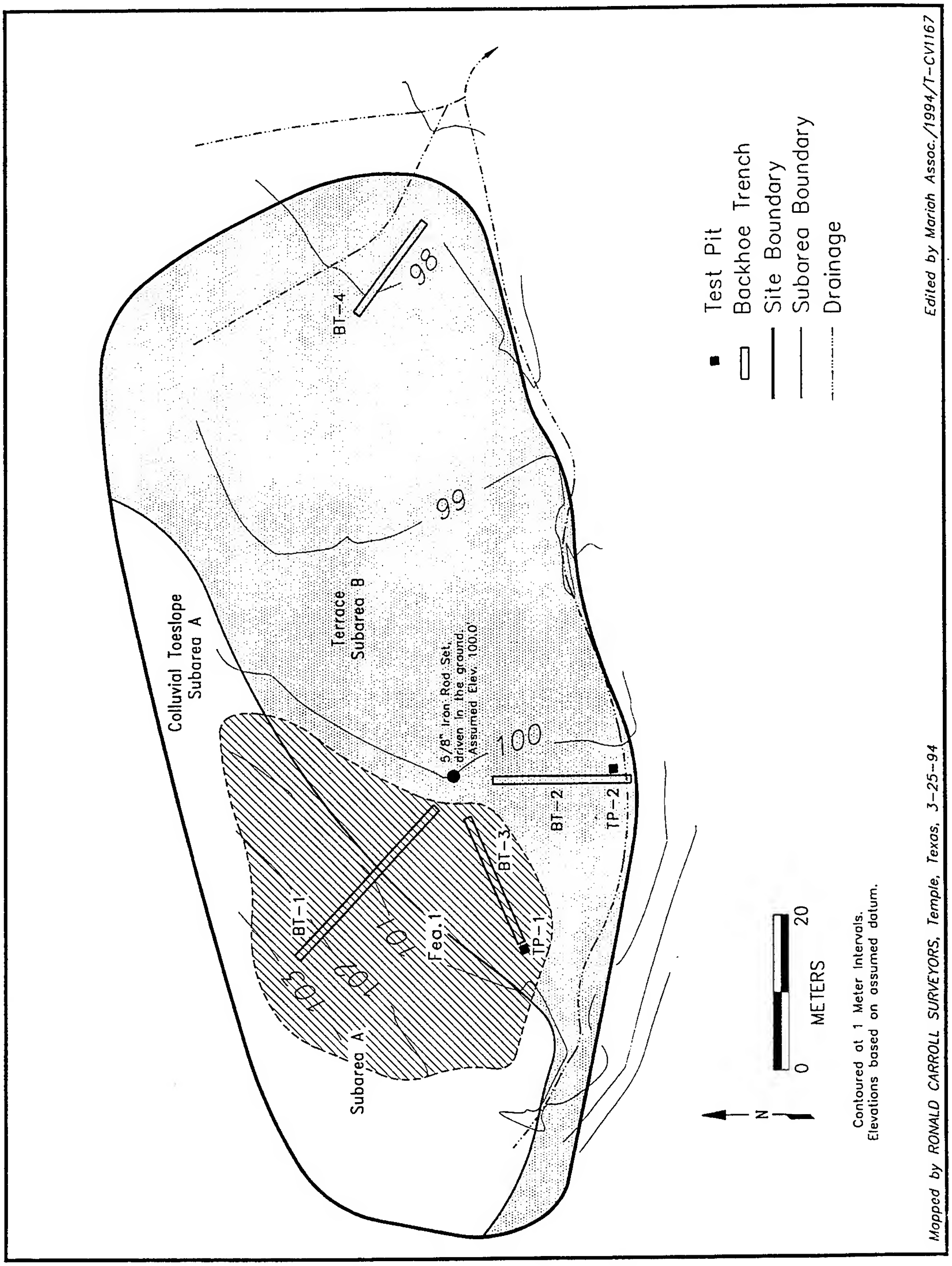

Figure 6.132 Site Map of 41CV1167.

It lies within a narrow, southeast-facing valley incised into the margin of the Manning surface. A highly vandalized burned rock midden covers the majority of the site. Maximum site dimensions are 85 x 65 m (about 5,525 m^2, or 1.4 acres). For purposes of this report, the site is considered a member of the Shell Mountain site group.

6.23.1.2 Previous Work

This site was recorded by Dureka, McCabe, Davis, Hoffman, and Rodriguez on 14 February 1986 as a vandalized burned rock and shell midden. A high density of burned rock, mussel shell, debitage, bifaces, and bone was observed. Two mano fragments were collected from the site. Based on vandal pit exposures, the site was noted as containing less than 1 m of clay loam. The site was estimated to be 70% disturbed by vandalism and bivouac activity.

Abbott, Lintz, and Oglesby revisited the site in January 1992 and reevaluated the site based on archeological and geomorphic observations. The site was divided into Subarea A (colluvial toeslope) and Subarea B (alluvial terrace). The dense cultural midden appeared to be at the juncture of the subareas. Because both subareas had the potential to contain intact cultural deposits, four shovel tests were excavated within Subarea A and eight shovel tests were excavated within Subarea B. All tests were productive, but the four in Subarea A were the least productive and the shallowest. The eight tests within Subarea B were placed on the burned rock midden and were extremely productive. Recovered items included burned rock, debitage, bone, mussel shell, and a Scallorn arrow point. Cultural material was recovered up to a depth of 80 cmbs but the context of this material was questionable. The results of shovel testing suggested that the site might contain intact cultural material, but the site's eligibility status remained uncertain. The site was recommended for avoidance or for formal eligibility testing if avoidance was not possible. Two to four 1 x 1 m of manually excavated test pits and two to three backhoe trenches were recommended to determine NRHP eligibility (Trierweiler 1994:A1306-A1313).

6.23.1.3 New Work

Two test pits (TP 1 and TP 2) and four backhoe trenches (BTs 1 through 4) were excavated on the site (Table 6.176). The test pits were offset from BT 3 and BT 2, respectively. Recovered cultural material is summarized in Table 6.177.

6.23.2 Results

Feature 1 is an extensive burned rock midden. Observations of the feature were based on surface exposure, the extent of vandalism, and the results of test excavations. The feature is approximately 50 m long x 50 m wide and buried from 20 to 55 cmbs (35 cm thick). Numerous, large vandal pits and piles of backdirt are present across the surface of the feature. Artifacts observed on the surface included debitage, bifaces, bone fragments, mussel shell, burned rocks, two manos, and a metate fragment.

Trench 1 was excavated to 1 mbs in the northern portion of the burned rock midden (F 1), from the lower colluvial toeslope (Subarea A) down across the distal alluvial terrace (Subarea B). The trench profile revealed a sequence of gravelly alluvium inset into an older body of colluvium and slopewash over weathered limestone. Two

Table 6.176 List of Treatment Units, 41CV1167.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	28	0.8	100
2	BT 2	19	0.8	180
2	BT 3	19	0.8	150
2	BT 4	15	0.8	170
2	TP 1	1.0	1.0	90
2	TP 2	0.7	1.3	110

Table 6.177 Artifact Recovery by Test Pit, 41CV1167.

	TEST PIT 1					TEST PIT 2				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	4	3	0	0(0)	0	0	0	0	2(0.1)
2	0	0	1	0	1(0.5)	0	1	3	1	3(0.2)
3	0	15	54	2	15(3)	0	0	2	0	1(0.1)
4	3	126	464	22	110(3)	0	7	0	0	1(0.1)
5	0	59	118	9	50(25)	0	0	1	0	4(0.5)
6	0	4	4	1	10(5)	0	0	2	0	2(0.3)
7	0	1	1	0	6(5)	0	5	2	0	0(0)
8	0	0	8	0	4(2)	0	2	0	1	1(0.1)
9	0	1	8	0	0(0)	0	1	2	3	4(0.5)
10						0	1	3	0	3(0.5)
11						0	0	0	0	9(3)
TOTAL	3	210	661	34	130(44.9)	0	17	15	5	732(321.5)

measured sections were recorded. The upslope section was almost entirely made up of colluvium and slopewash and exhibited an A-Bw-Ck profile. Zone 1 was 20 cm thick and consisted of black (10YR 2/1) granular clay loam to stony clay loam. It contained moderate amounts of burned rock and flakes, suggesting that it is on the margin of the midden revealed in BT 3. Zone 2 was 15 cm thick and consisted of very dark grayish brown (10YR 3/2), granular stony clay loam. It was separated from Zone 3 by an abrupt erosional boundary mantled with limestone clasts. Zone 3 consisted of dark grayish brown (10YR 4/2) silty loam and was approximately 40 cm thick. It was separated from Zone 4 by an abrupt, broken boundary. Zone 4 consisted of weathered bedrock. No cultural material was observed below Zone 1.

The downslope section of the trench was composed of gravelly alluvium overlain by a thin mantle of slopewash and sheetwash from vandal spoil piles on the adjacent midden. Zone 1 was approximately 25 cm thick and consisted of black (10YR 2/1), granular gravelly clay loam. It contained considerable quantities of flakes, burned rock, and bone that probably washed off the midden. Zone 2 was approximately 10 cm thick and consisted of very dark grayish brown (10YR 3/2), massive gravelly clay loam. Zones 3 and 4 consisted of massive clayey gravel that probably represents an alluvial/colluvial admixture. The zones graded from dark brown (7.5YR 3/2) to light brown (7.5YR 6/4) with depth and contained fine, soft masses of carbonate in Zone 4. Overall, the downslope end of the trench exhibited an A-Bw-Ck profile. No cultural material was noted beneath Zone 1. The contextual integrity of cultural materials in Zone 1 is questionable in both the upslope and downslope sections of the trench.

Trench 3 was excavated through the midden (F 1) and exposed an Ap-A-Bk profile. Zone 1 (the Ap horizon) consisted of vandalism spoil and backfill, and varied between roughly 10 cm and 50 cm in thickness. It was inset into Zone 2, which consisted of unvandalized midden deposits. Both zones were composed of a black (10YR 2/1) granular clay loam surrounding abundant burned

rock, flakes, stone tools, mussel shell, and bone. Although surface expression clearly indicated extensive vandalism, it was very difficult to visually distinguish between intact and disturbed midden sediments in section. Most determination of integrity was based on the consistence of the fine matrix, which was considerably more friable in the disturbed areas. Zone 3 extended from approximately 70 cmbs to the base of the trench at 120 cmbs, and consisted of very dark grayish brown (10YR 3/2), blocky gravelly clay shot through with flecks and filaments of carbonate. No cultural material was noted in Zone 2.

Although the majority of the cultural material exposed in BT 3 was thought to be disturbed by vandalism, a few meters of the midden at the western end of the trench appeared to be intact. The cultural material at this portion of the trench was within a structured clay loam. Test pit 1 was placed at the western end of BT 3 and excavated through the midden to a gravely matrix at 90 cmbs. A few lithics and bone fragments were found from 0 to 20 cmbs, but these items were recovered from a loose soil that was interpreted as vandal backdirt. The burned rock midden (F 1) was encountered from 20 to 55 cmbs.

Approximately 200 angular burned rocks (63 kg) were recovered from the feature in TP 1. Burned rock frequencies were low in the upper and lower level of the feature and high in the central levels. The midden matrix was rich with charcoal, debitage, and bone, and several projectile points (including five Scallorn arrow points, one untyped arrow point, and one untyped dart point) were recovered from 20 to 40 cmbs. One radiocarbon age of 410 ± 80 BP (Beta 75265) was obtained from charcoal in the matrix of Level 4. This age is somewhat surprising, given that Scallorn points are typically associated with occupations dating from the earlier part of the Late Prehistoric (Austin Phase, 700 to 1200 A.D.; Turner and Hester 1993).

A second corrected radiocarbon age of 610 ± 50 BP (Beta b-79049), obtained from a carbonized post (F 2), was encountered from 32 to 52 cmbs in the northeast portion of TP 1 (Figure 6.133). Feature 2 was positioned vertically within the midden matrix. In profile, the post extended from 32 to 52 cmbs and was identified as a single piece of shaped, carbonized wood that subsequently proved to be live oak. The shape of the post tapered down from 10 cm in diameter at the top to a 5 cm diameter flat bottom. Except for a few small roots growing through the post, the feature was undisturbed and intact.

The reason for the 200-year discrepancy between the ages obtained from the post and the matrix surrounding it is unclear. Part of the difference may be a simple function of the age of the wood at the time of utilization. If the post was manufactured from wood taken from a mature live oak, or from dead wood, it would not be at all surprising for the specimen to date 100 years or more older than the date that it was taken and used (Schiffer 1987:309-310). On the other hand, while the post is in demonstrably good context, it is possible that the charcoal sample from the Level 4 matrix was churned deeper into the mound by natural and/or cultural disturbance processes. Finally, because the matrix age is from the upper end of the vertical post, it is conceivable that the

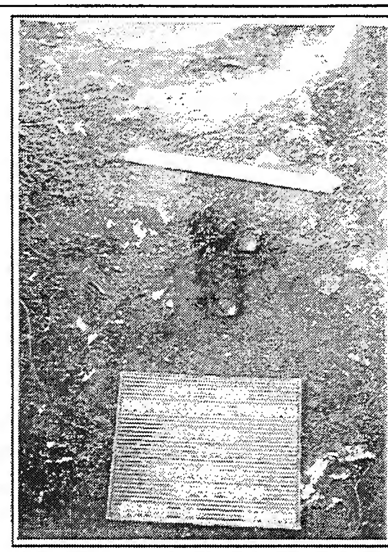

Figure 6.133 Profile of F 2 (Carbonized Post), 41CV1167, Looking West.

difference in ages represents the period over which the midden accreted from approximately 50 cm below the modern surface to 30 cm below the modern surface. In any case, the radiocarbon data suggests that the midden dates to between approximately 400 BP and 600 BP during the mid- to latter Late Prehistoric.

Below F 1, artifact frequencies decreased dramatically from 55 to 60 cmbs. The base of F 1 was determined to be at 55 cmbs due to this decrease of material; however, several flakes, a few burned rocks, and a couple of bone fragments continued to be found from 60 to 90 cmbs. The gravel content within the soil from 60 to 90 cmbs increased with depth.

Trench 2 was excavated to a depth of 180 cm in the low T_1 terrace, and extended more than 1 m below the elevation of the modern channel. Zone 1 was approximately 30 cm thick and consisted of black (10YR 2/1), weak granular gravelly clay loam. It contained a moderate amount of dispersed flakes and burned rock. Zone 2 extended to the base of the trench and consisted of thick, stratified packets of very dark grayish brown (10YR 3/2) gravelly clay loam and gravelly sandy clay loam. Stratification was apparent primarily due to variability in gravel content. Burned rock and flakes were dispersed throughout, and carbonate filaments were evident below 140 cm. A possible feature composed of burned rock, charcoal flecks, and reddened clay was apparent 110 to 120 cmbs. Overall, the trench exhibited an A-C profile.

Test pit 2 was placed above the possible hearth located in the east wall of BT 2. Recovery from this test pit included a few lithics (flakes and burned rocks) and/or ecofacts (bone fragments and snail shell) from each level excavated from 0 to 110 cmbs. In addition to these artifacts, an untyped arrow point fragment was recovered from 10 to 20 cmbs. These cultural materials were recovered from matrix containing a moderate to high density of gravels. The burned rock cluster observed within the wall of BT 2 at 100 to 110 cmbs consisted of nine scattered burned rocks interspersed among large, unburned clasts. Therefore, the cultural material recovered from this test pit appeared to be redeposited, possibly from the midden upslope.

Trench 4 was situated in a similar setting farther downstream, near the confluence of the drainages within Subarea B. The trench exhibited an A-C profile developed in complexly bedded alluvial gravels and fines and contained only sparse, secondary burned rock. Due to its similarity to BT 3 and the lack of cultural material in primary context, the trench was not described in detail.

Eight projectile points were recovered from the excavations (Table 6.178). All but one of these points were recovered from the midden excavation in TP 1, Levels 3 to 4. Five of these points were Scallorn arrow points, two were untyped arrow points, and one was an untyped dart point. While none of the arrow points was manufactured from an identifiable chert type (possibly because their small size limited the diagnostic features necessary for identification), the dart point was manufactured from Heiner Lake Tan, and thus represents chert procurement from roughly 25 km distant. The nondebitage lithic assemblage consists of 32 specimens including one multiple platform core,

Table 6.178 Projectile Points, AU 1, 41CV1167.

	Lithic Material				
Point Type	06-HL Tan	Indet Lt Brown	Indet Lt Gray	Indet Misc.	Total
Other Arrow	0	1	0	1	2
Other Dart	1	0	0	0	1
Scallorn	0	4	1	0	5
Total	**1**	**5**	**1**	**1**	**8**

and various unifacially and bifacially modified tools (Table 6.179). Again, the predominate chert type present is the Heiner Lake Tan variety (41%), although other types from the Southeast Range (Heiner Lake Blue), West Fort (Anderson Mountain Gray), North Fort (Fort Hood Yellow, Fort Hood Gray) and Cowhouse provinces (Cowhouse Mottled, Cowhouse Mottled/Flecked, Heiner Lake Translucent Brown) are also present in low numbers. However, according to the lithic material analysts, the Cowhouse Mottled/Flecked type can be misidentified as Heiner Lake Tan, which could explain the high incidence of a distant chert type in this assemblage.

A needle of mammalian bone was recovered from the excavations in Test Pit 1, Level 4. The specimen is categorized as a needle not only because of its thin and delicate nature but by the remnant of a hole at its proximal end.

A large and diverse suite of chert, including 12 identified types and seven indeterminate categories, was represented in the recovered debitage (Table 6.180). Roughly 21% of the assemblage was typed. When the entire assemblage was considered, Fort Hood Yellow and the aggregate indeterminates occurred in greater than expected frequency, while the remainder of identified types occurred in less than expected frequency. When the indeterminates were excluded, Fort Hood Yellow occurred in greater than expected frequency, Cowhouse Dark Gray occurred in expected frequencies, and the remainder of types occurred in less than expected frequencies (Table 6.181).

All four chert provinces are represented in the debitage assemblage. However, the North Fort province (four types comprising 84% of the

Table 6.179 Cores and Nonprojectile Point Lithic Tools, AU 1, 41CV1167.

	Core Type	Tool Type									
Lithic Material	multiple platform	early stage biface	edge modified	late stage biface	middle stage biface	preform	side scraper	uniface	utilized flake	wedge	Total
03-AM Gray	0	0	0	0	0	1	0	0	0	0	1
06-HL Tan	0	2	0	2	3	1	0	3	1	1	13
08-FH Yellow	1	0	0	1	0	0	0	0	0	0	2
09-HL Tr Brown	0	0	0	0	0	0	0	1	0	0	1
10-HL Blue	0	0	0	1	0	0	0	0	0	0	1
14-FH Gray	0	1	1	0	0	0	0	0	0	0	2
18-C Mottled	0	0	0	0	0	0	0	0	0	1	1
22-C Mott/Flecks	0	0	0	0	0	0	1	1	0	0	2
Indet Dk Brown	0	0	0	2	0	0	0	0	0	0	2
Indet Dk Gray	0	0	0	0	0	0	0	0	1	0	1
Indet Lt Brown	0	0	1	1	0	0	0	2	0	0	4
Indet Lt Gray	0	0	0	1	0	0	0	0	1	0	2
Total	**1**	**3**	**2**	**8**	**3**	**2**	**1**	**7**	**3**	**2**	**32**

identified total) is dominant due almost entirely to the overwhelming presence of Fort Hood Yellow, which comprises 77% of the identified total. Moreover, the indeterminates are dominated by indeterminate light browns, suggesting that Fort Hood Yellow is also a significant presence in the indeterminate flakes. This is in strong contrast to the tool assemblage, where Heiner Lake Tan comprises almost half of the assemblage. While Heiner Lake Tan, if unidentified, will also be classified as an indeterminate light brown, the low identification rate of the material in the debitage assemblage (2 flakes comprising 1.4% of the identified fraction) suggests that it probably is not a major component of the overall assemblage. The other three chert provinces are represented in the assemblage at very low levels. The most strongly represented is the Cowhouse Province, which is represented by four types comprising 11% of the total, while the Southeast Range is represented by three types comprising 5%. West Fort is represented by a single flake of Anderson Mountain Gray (less than 1%).

Table 6.180 Debitage Recovery by Size and Material Type, AU 1, 41CV1167.

Lithic Material	Size (cm) < 0.5	0.5 - 0.9	0.9 - 1.	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types							
02-C White	0	0	0	1	0	0	1
03-AM Gray	0	0	0	1	0	0	1
06-HL Tan	0	0	0	2	0	0	2
07-Foss Pale Brown	0	0	0	3	1	0	4
08-FH Yellow	23	50	21	12	2	0	108
09-HL Tr Brown	0	0	0	1	0	0	1
14-FH Gray	0	2	1	0	0	0	3
15-Gry/Brn/Grn	0	0	0	3	0	0	3
17-Owl Crk Black	0	0	3	0	0	0	3
18-C Mottled	0	0	1	0	2	2	5
19-C Dr Gray	1	3	2	2	0	0	8
27-C Novaculite	0	0	0	0	0	1	1
Subtotal	*24*	*55*	*28*	*25*	*5*	*3*	*140*
Unidentified Types							
Indet Black	3	3	0	0	0	0	6
Indet Dk Brown	9	40	2	15	3	0	69
Indet Dk Gray	1	6	3	0	0	0	10
Indet Lt Brown	66	167	80	46	19	8	386
Indet Lt Gray	18	20	10	4	0	0	52
Indet Misc.	0	1	0	0	0	1	2
Indet White	0	5	4	0	1	0	10
Subtotal	*97*	*242*	*99*	*65*	*23*	*9*	*535*
Total	**121**	**297**	**127**	**90**	**28**	**12**	**675**

Table 6.181 Binomial Statistic Results, AU 1, 41CV1167.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	1	38	66	less	6	19	less
03-AM Gray	1	38	66	less	6	19	less
06-HL Tan	2	38	66	less	6	19	less
07-Foss Pale Brown	4	38	66	less	6	19	less
08-FH Yellow	108	38	66	more	6	19	more
09-HL Tr Brown	1	38	66	less	6	19	less
14-FH Gray	3	38	66	less	6	19	less
15-Gry/Brn/Grn	3	38	66	less	6	19	less
17-Owl Crk Black	3	38	66	less	6	19	less
18-C Mottled	5	38	66	less	6	19	less
19-C Dr Gray	8	38	66	less	6	19	expected
27-C Novaculite	1	38	66	less	6	19	less
Total Indet	535	38	66	more	na	na	na

Table 6.182 Debitage Cortex Characteristics by Material Type, AU 1, 41CV1167.

	All Cortex	Partial Cortex				
Lithic Material	Indeterminate	Abraded	Unabraded	Indeterminate	No Cortex	Total
Identified Types						
02-C White	0	0	0	0	1	1
03-AM Gray	0	0	0	0	1	1
06-HL Tan	0	0	0	0	2	2
07-Foss Pale Brown	0	0	0	0	4	4
08-FH Yellow	0	3	0	15	90	108
09-HL Tr Brown	0	0	0	0	1	1
14-FH Gray	0	0	0	0	3	3
15-Gry/Brn/Grn	0	0	0	0	3	3
17-Owl Crk Black	0	0	0	0	3	3
18-C Mottled	0	0	0	0	5	5
19-C Dr Gray	0	1	0	0	7	8
27-C Novaculite	0	0	0	0	1	1
Subtotal	*0*	*4*	*0*	*15*	*121*	*140*
Unidentified Types						
Indet Black	0	0	0	0	6	6
Indet Dk Brown	1	2	0	3	63	69
Indet Dk Gray	0	0	0	0	10	10
Indet Lt Brown	2	10	3	36	335	386
Indet Lt Gray	0	0	0	5	48	53
Indet Misc.	0	0	0	0	1	1
Indet White	0	0	0	0	10	10
Subtotal	*3*	*12*	*3*	*44*	*473*	*535*
Total	**3**	**16**	**3**	**59**	**594**	**675**

The size of flakes tends to be relatively small, with 94% smaller than 1.8 cm and 62% smaller than 0.9 cm. In addition, roughly 88% of the assemblage was decortified. Collectively, this suggests that latter stage reduction and/or the production of relatively small blanks and tools was predominant, which is consistent with the manufacture of arrow points (Table 6.182).

A moderately large faunal assemblage, dominated by unidentifiable fragments of deer-sized animals, was recovered from the midden (Table 6.183). Identified taxa include deer, squirrel/chipmunk, and pocket gopher, which may represent an intrusive species. However, much of the highly fragmented bone of the larger animals is clearly modified (23% of the bone is burned, and 27% exhibits spiral fractures), indicating that it represents economic remains. Only three unidentifiable mussel shells were recovered, suggesting that aquatic resources were not a major component of the overall subsistence strategy.

Table 6.183 Faunal Recovery, AU 1, 41CV1167.

	Element																			
Vertebrates	Antler	Cervical Vertebra	Femur	Fused 3&4th metata	Fused central carpal	Humerus	Indeterminate	Long bone	Mandible	Metapodial	Pelvis	Permanent tooth	Phalange	Proximal Phalange	Rib	Tibia	Tooth	left	right	Total
Artiodactyla	0	1	1	3	0	0	0	0	1	1	1	0	1	3	0	1	0	0	0	13
Geomys bursarius	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mammalia	0	0	0	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	34
Mammalia (med/lg)	0	0	0	0	0	0	138	8	0	0	0	0	0	0	1	0	0	0	0	147
Odocoileus sp.	2	0	0	0	2	0	0	0	0	0	1	6	0	0	0	1	6	0	0	18
Sciuridae	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Vertebrata	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	12
Total	**2**	**1**	**1**	**3**	**2**	**1**	**184**	**8**	**1**	**1**	**2**	**7**	**1**	**3**	**1**	**2**	**6**	**0**	**0**	**226**
Bivalves																				
Unionacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3

6.23.3 Conclusions and Recommendations

This site is situated on a low, relatively high depositional energy terrace and associated colluvial toeslope. The majority of the terrace is underlain by relatively recent, gravelly clay alluvium cut with many gravelly lags and truncation surfaces. Although the age of this material has not been established, it appears to be late Holocene and probably represents the West Range and/or Ford fills of Nordt (1992). Much cultural material is interbedded in these deposits. Although the flashy depositional conditions suggested by these deposits makes the integrity of the intercalated archeological remains somewhat suspect, at least some of the material appears to be in primary or semiprimary context.

The principal feature of the site is a large, amorphous midden deposit that has been extensively disturbed. The midden is underlain by alluvium that appears somewhat older and better sorted than the fill under the remainder of the terrace. No cultural material was detected in the alluvium under the midden. The colluvial slopes are mantled with a stony clay that contains considerable cultural material, much of which is probably derived from sheet erosion of the adjacent midden.

Although the midden is extensively disturbed, it still seems to contain relatively intact areas. The burned post (F2) confirms the integrity of that part of the midden because it would not have survived excavation and redeposition by vandals using crude techniques. The vertical position of the post implies that it may be the remains of some type of structure (either a shelter or rack system of some type), and that other such posts may be nearby. Since little data exists on the prehistoric use of structures in Central Texas, this possibility is scientifically exciting. In addition, the site contains relatively high amounts of faunal remains that can be integrated with lithic data to perform technological analyses outlined in the research domains for Fort Hood (Ellis 1994b).

On the basis of the foregoing, we judge 41CV1167 to be significant and eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because most known eligible components on the site are on the surface or shallowly buried, they are vulnerable to impacts from training and other activities that affect the surface of the site. Furthermore, deposits on and off of F 1 have a demonstrated history of damage from vandalism. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, and (2) prevent mechanical or manual excavations by military personnel.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 100 m^2 in area. Excavations should focus on the area near TP 1, and should attempt to incorporate off-midden deposits. Known, relatively dense assemblages with features occur up to at least 1 m thick. Excavated volume in and near F 1 could reach approximately 100 m^2. Placement of blocks should be based on carefully monitored mechanical trench excavations that provide an array of options for locating optimal cultural deposits. In addition, trenches should be excavated to allow for collection of geoarcheological data and to prospect for additional deposits in off-midden contexts.

6.24 SITE 41CV1200

6.24.1 Introduction

In late August and early September 1993, Mariah conducted test excavations at site 41CV1200. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis at al. 1994).

6.24.1.1 Location and Description

41CV1200 is located in the western part of the fort on a broad Pleistocene terrace of Cowhouse Creek and an inset Holocene terrace of an unnamed tributary (Figure 6.134). The unnamed tributary forms the western and northern boundary of the site, and separates it from 41CV95 to the west (Figure 6.135). Old vehicle trails have impacted several areas of the site. Most of the site is covered with juniper and hardwood trees, but grass covers the surface where it has been cleared. The site measures 200 x 175 m (about 35,000 m^2, or 8.6 acres). For purposes of this report, the site is considered to be a member of the West Cowhouse site group.

6.24.1.2 Previous Work

The site was first recorded by Kooren in 1986, who described it as a heavy scatter of burned rock (mainly evident in roadcuts across the site) and a thin flake scatter. The site was described as having 1 m deep cultural deposits before encountering older sediments.

Frederick and Quigg revisited the site on 15 January 1992, at which time geomorphological and archeological assessments were made and two subareas were defined. Subarea A is a dissected Pleistocene terrace of Cowhouse Creek where the burned rock deposits were observed during the 1986 survey. Vehicle paths bisect Subarea A, and no in situ deposits were thought to be present other than thin cultural deposits in the vicinity of several

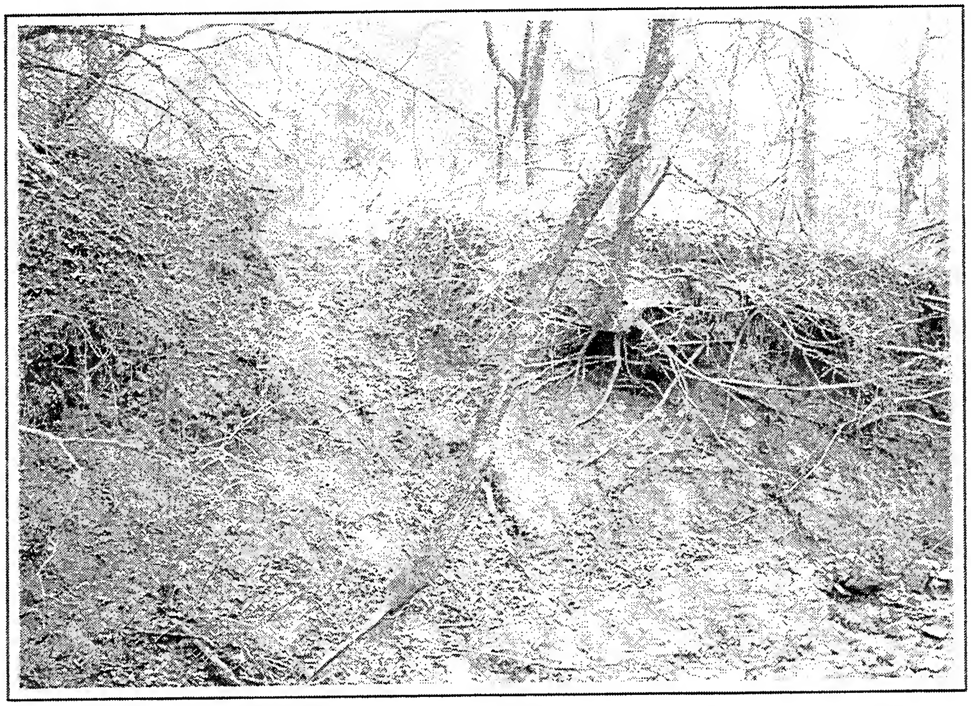

Figure 6.134 Overview of Site 41CV1200, Looking East at Cutbank.

exposed burned rock concentrations. Subarea B was defined as a small lower terrace formed by an unnamed tributary of Cowhouse Creek. The surface of the lower terrace was partially obscured by the December 1991 flood (which occurred just a month prior to the assessment), but subsurface cultural deposits were observed in the tributary cutbank at a depth of 30 cmbs.

A shovel testing crew returned to the site on 2 to 3 March 1992, and excavated nine shovel tests on the site, with four in Subarea A and five in Subarea B. The tests on Subarea A were placed in the burned rock areas. Cultural material was found as deep as 40 cmbs; however, a piece of rubber tank tread found at 30 cmbs suggested the fairly thin deposits of Subarea A may have been greatly disturbed by vehicle traffic. The five shovel tests in Subarea B were excavated to depths ranging from 40 to 80 cmbs, indicating deeper deposits were present than existed in Subarea A. Testing yielded only a single burned rock from one test at 20 to 30 cmbs.

Subarea A was thought to be totally disturbed by vehicle traffic and was not recommended for further management. Subarea B, while yielding only the single burned rock, had the potential for deeply buried cultural material. Therefore, the site's eligibility for inclusion in the NRHP was uncertain, and the site was recommended for avoidance or formal testing if avoidance was not feasible. Recommendations for formal testing consisted of at least two backhoe trenches and two manually excavated 1 x 1 m test units on Subarea B (Trierweiler 1994:A1344-A1345).

6.24.1.3 New Work

Two trenches (BT 1 and BT 2) were excavated in Subarea B in order to examine the deposits and to prospect for buried cultural material within the tributary valley. The first of these was situated in the center of the meander and targeted the most stable portion of the landform. The second trench was placed on the south side of the meander, in the vicinity of a burned rock feature which was observed eroding from the cutbank at an

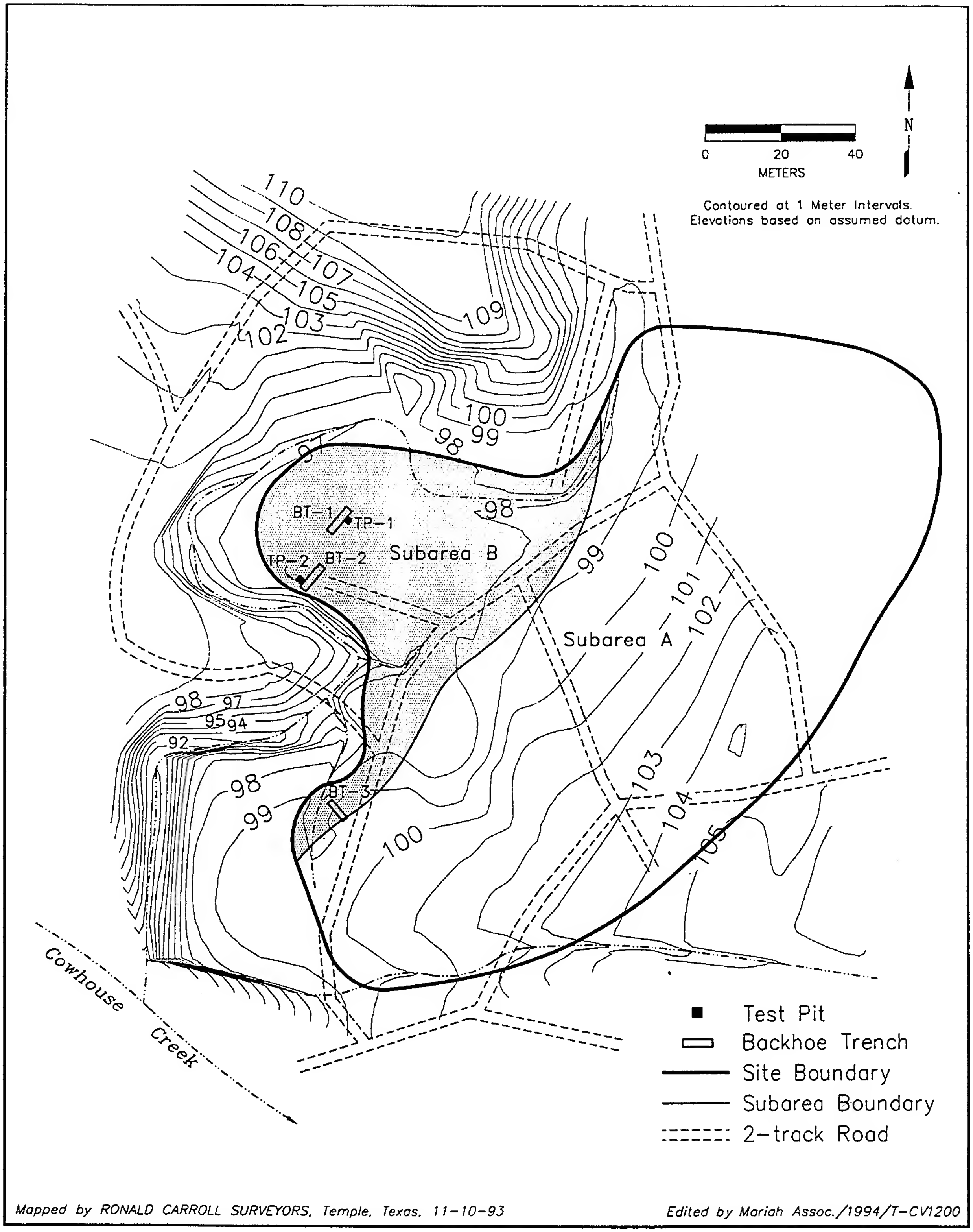

Figure 6.135 Site Map of 41CV1200.

approximate depth of 120 cmbs. Two 1 x 1 m excavation units (TP 1 and TP 2) were offset from BT 1 and BT 2, respectively. Test pit 1 was excavated to an older subsoil and TP 2 was excavated to an oxidized zone near the base of the burned rock feature. A total of 4.8 m^2 was manually excavated on the site during the testing phase. Treatment units excavated on the site are summarized in Table 6.184, and recovered cultural material is summarized in Table 6.185.

Table 6.184 List of Treatment Units, 41CV1200.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cm)
1	BT 1	1.0	0.8	280
1	BT 2	1.0	0.8	300
1	TP 1	1.0	1.0	240
1	TP 2	1.0	1.0	240

Table 6.185 Artifact Recovery by Test Pit, 41CV1200.

	TEST PIT 1					TEST PIT 2				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	0	0	0(0)	0	0	0	0	0(0)
2	0	2	0	0	0(0)	0	0	1	0	3(0.9)
3	0	0	0	0	0(0)	0	0	0	0	0(0)
4	1	0	8	1	0(0)	0	0	0	0	0(0)
5	0	3	46	0	25(4)	0	0	0	0	0(0)
6	12	7	55	1	40(25)	1	0	1	0	10(1)
7	0	15	0	0	15(5)	0	0	0	0	6(1.5)
8	0	0	1	0	10(2)	0	0	2	0	1(0.9)
9	0	1	2	0	5(2)	2	1	0	0	3(0.4)
10	0	0	0	0	4(2)	0	0	0	0	6(1)
11	0	0	0	0	3(0.9)	0	1	0	0	3(0.9)
12	0	6	5	0	25(3)	2	2	6	0	0(0)
13	0	0	0	0	3(1)	0	0	3	0	73(19)
14	0	0	0	0	0(0)	0	2	0	0	0(0)
15	0	0	0	0	0(0)	0	0	0	0	626(294.5)
16	0	0	0	0	0(0)	0	0	0	0	0(0)
17	0	0	0	0	0(0)	0	0	0	0	0(0)
18	0	0	0	0	0(0)	0	0	0	0	0(0)
19	0	0	0	0	0(0)	0	0	0	0	1(1.4)
20	0	0	0	0	0(0)	0	0	0	0	0(0)
21	0	0	0	0	0(0)	0	0	0	0	0(0)
22	0	0	0	0	0(0)	0	0	0	0	0(0)
23	0	0	0	0	0(0)	0	0	0	0	0(0)
24	0	0	0	0	0(0)					
TOTAL	13	34	117	2	130(84.9)	5	6	13	0	732(321.5)

6.24.2 Results

Both of the trenches penetrated the same alluvial fill, but the sequence and volume of facies present in each trench varied. The first trench (BT 1) exhibited an A-AB-Bw-Bk-BC-C soil profile formed in the tributary alluvium. The basal unconformity between this alluvial fill and an older fill of Cowhouse Creek was uncovered at 270 cmbs. The top 140 cm of the fill consisted of medial to distal overbank sediments (massive silt loam, loam and silty clay loam). The sediments between 140 and 240 cmbs consist of thin to medium beds (5 to 30 cm thick) of alternating coarse (sand and muddy sand) and fine (silt loam) deposits which are interpreted as representative of a channel proximal overbank environment. A medium bed of muddy gravel rested immediately upon the unconformity, between the tributary fill and the older Cowhouse Creek deposits into which the tributary alluvium is inset. During excavation of BT 1, several burned rocks, lithics, and burned bone fragments were observed in the upper 60 cm of fill, and a burned rock concentration (F 1) was observed in the profile at a depth of 45 to 60 cmbs.

Test pit 1 (Figure 6.136) was placed over F 1 and excavated to a depth of 240 cmbs. The upper 30 cm of the test pit were almost sterile, yielding only two large long-bone fragments from a bovine-size mammal from 10 to 20 cmbs. An unburned, undecomposed log encountered stratigraphically below these bones implied that they may be of historic origin. However, the context of the upper deposits is not well established, and it also is possible that the bones are prehistoric.

From 40 to 70 cmbs, each level contained high counts of cultural material. Within this peak of recovered cultural material, the burned rock concentration (F 1) was encountered from 45 to 68 cmbs. Numerous burned rocks and flakes, several bone fragments, and a few mussel shells were recovered from the feature, which was composed of 80 blocky burned rocks (34 kg total) that formed a dense pavement across the entire test pit (see Figure 6.136). The rocks ranged from fine gravel to pieces up to 20 cm in maximum dimension, and lay on a horizontal plane that did not detectably slope in any direction. Some of the rocks were placed on top of each other, but not in any consistent pattern. The pavement-like quality of the rocks and the presence of fractured rocks with conjoinable faces, indicating that they had been cracked in place, suggests that the feature is intact. No staining or oxidized earth was associated with F 1.

Below the feature, significantly fewer burned rocks and flakes were found from 70 to 110 cmbs. A couple of bone fragments were found at 110 to 120 cmbs and no cultural material was found in the remainder of the test pit (120 to 240 cmbs).

A measure of chronometric control for TP 1 is provided by A/I ratios on nine *Rabdotus* sp. snails recovered from Level 21, near the base of the test pit. Although the A/I ratios from these individuals ranged from 0.0288 to 0.0748, suggesting a radiocarbon-equivalent age ranging from approximately 850 to 3000 BP, a cluster of three individuals exhibited A/I ratios of approximately 0.043 to 0.048, which equates to a radiocarbon-equivalent age of roughly 1500 to 1800 BP. These three individuals are considered the best estimate of the age of the deposition. One other snail appears intrusive, while the remainder appear to represent alluvial reworking of older specimens.

The second trench (BT 2) (Figure 6.137) exhibited a similar horizon sequence (A-AB-Bk-BC) but exposed a thicker sequence of overbank facies deposits than that in BT 1. The top 190 cm of the profile consisted of massive fine-grained alluvium (silt loam, silty clay loam, and loam) within which two cultural occupations were observed. The youngest of these appeared to be about 80 cmbs, but was poorly exposed in the trench walls. A burned rock feature (F 2) was observed in this trench between 120 to 140 cmbs and appears to be correlative with a feature observed in the cutbank walls. Rhythmically bedded, fine-to-coarse-grained deposits representative of a channel proximal

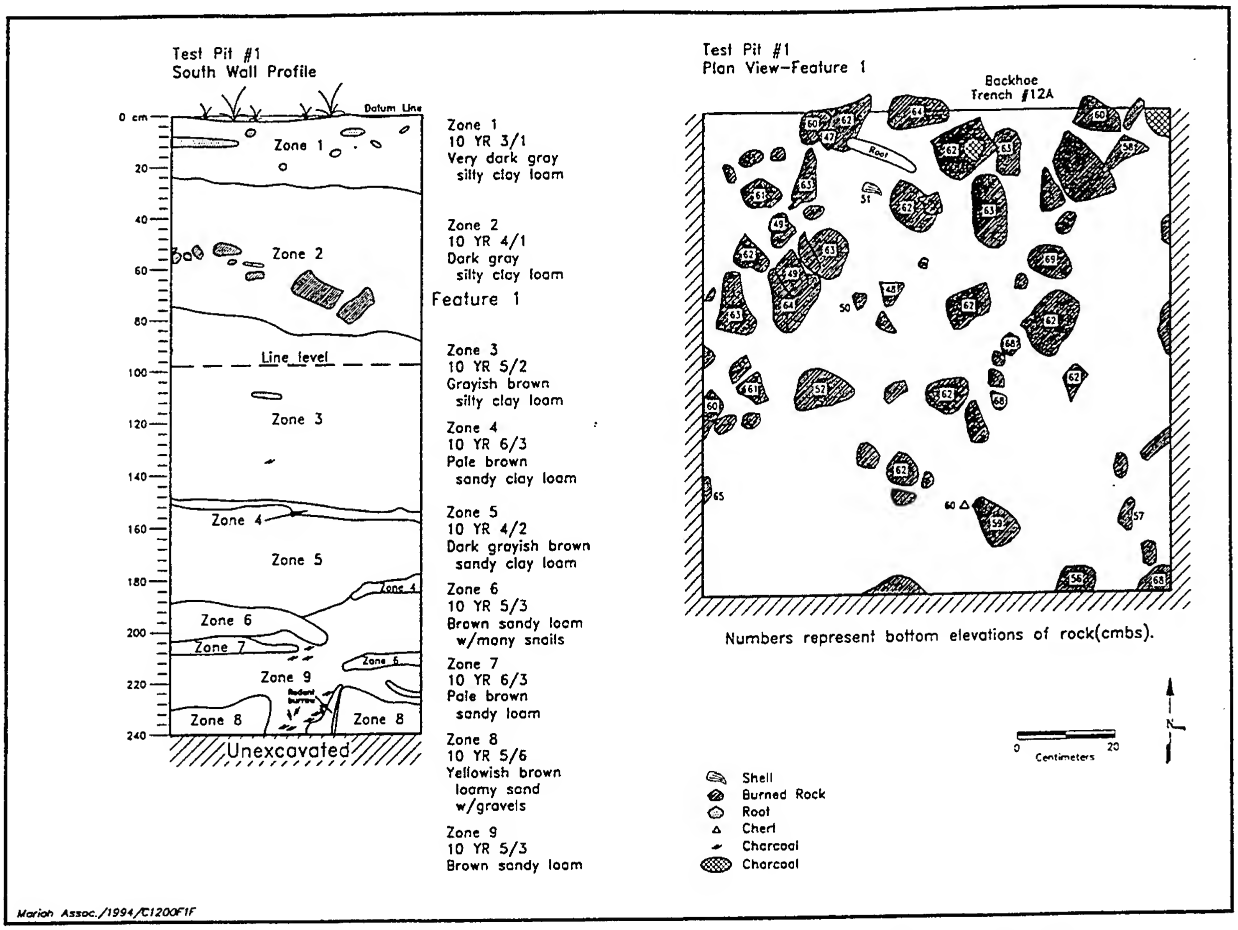

Figure 6.136 Profile of South Wall, TP 1, and Plan of F 1 (70 cmbs), TP 1, 41CV1200.

depositional environment were observed in this trench between 190 and 260 cmbs.

Test pit 2 was placed above the probable hearth exposed in BT 2 and excavated to a depth of 240 cmbs. Artifact recovery was scant in the upper 60 cm of TP 2. Burned rocks were recovered in small, varying amounts from each level from 60 to 110 cmbs, possibly suggesting a series of stratified occupations, although only a couple of flakes, bone fragments, and mussel shells were found within these levels. Of note, a stratigraphically distinct lens of snails (several centimeters thick) occurred at about 60 cmbs, and capped the levels consistently containing burned rocks. A corrected radiocarbon age of 740 ± 60 years B. P. (Beta B-70030) was obtained from charcoal collected from 60 to 70 cmbs.

Additional chronometric information is provided by a suite of nine A/I ratios of *Rabdotus* from TP 2, Level 7. These ratios ranged from 0.0266 to 0.0607, which equate to radiocarbon-equivalent ages between approximately 775 and 2350 BP. Six of these ratios cluster loosely (i.e., while all do not overlap at ±5%, each overlaps its nearest neighbor on the low end and/or high end within this margin of error) around a mean radiocarbon-equivalent age of 984 BP; in fact, three of these ratios are analytically identical, and regress to an age of 974 BP. Therefore, this age is best indicative of the age of the level when only A/I information is considered, but is approximately 250 years older than the radiocarbon age obtained from the same context. Interestingly, one anomalously young snail (Radiocarbon equivalent age of approximately 775 BP) was recovered that is

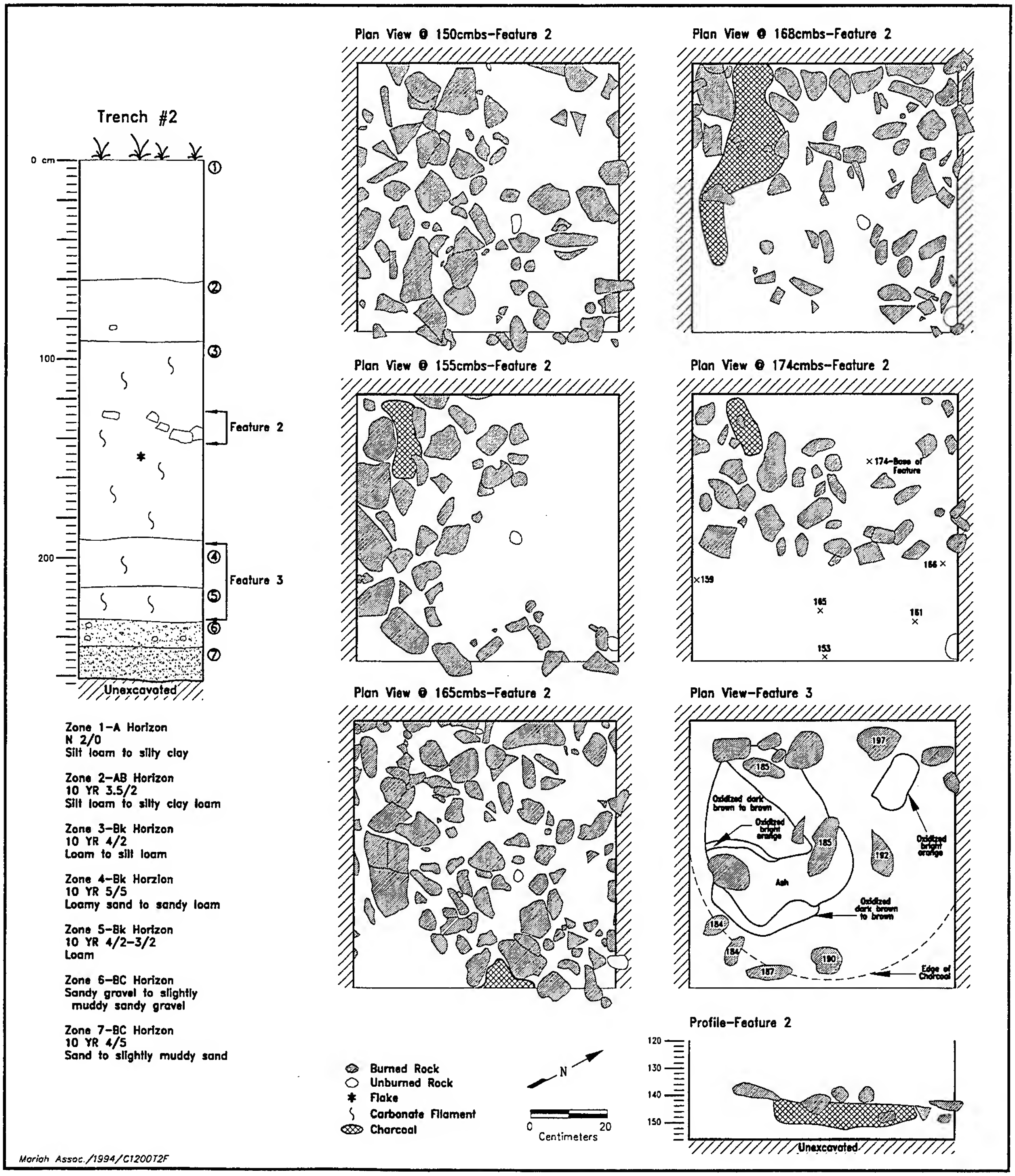

Figure 6.137 Measured Section, BT 2, Successive Plan Views of F 2 (150, 155, 165, 168, and 174 cmbs), TP 2, Plan and Profile, F 3 (200 cmbs), TP 2, 41CV1200.

statistically identical to the radiocarbon date. This suggests that either (1) the carbon dated was also intrusive; (2) the snails were subjected to very minor, even heating that accelerated the A/I reaction in a consistent manner; or (3) the discrepancy is due to a 100 to 200 year "age anomaly" in the snails used to calculate the regression (see Section 8.5).

A sharp increase in artifact frequency (burned rock, flakes, bone) occurred from 110 to 120 cmbs. A corrected radiocarbon age of 1240 ± 60 years BP obtained from Level 11 (100 to 110 cmbs) provides an approximate upper age for the dense cultural levels below. Feature 2 (see the five sequential plan views in Figure 6.136) was encountered from 128 to 174 cmbs. It consisted of a large, internally structured hearth that extended beyond the limits of TP 2 (Figure 6.138). Evidence in the unit and trench profiles suggests a diameter of approximately 1.3 m. A total of 699 burned rocks (313.5 kg total) were recovered from the feature. The rocks ranged from gravel size to a few tabular pieces over 15 cm in diameter. When first encountered, the top of the feature extended across the entire test pit and appeared as a ring of rocks filled with a light silt matrix. Removal of the silt from the ring revealed a shallow bowl shape lined with a layer of rocks (most of which were angular, some of which were tabular) placed along the base and edges of the feature to form a 45° slope at the base of this layer of rock. Under this first layer of rock was a 1 to 2 cm thick layer of charcoal-laden matrix, which in turn was underlain by a second layer of burned rocks, similar to the upper layer. Below the second layer of rocks was a third layer of burned rocks. The third layer was neither as well structured as the upper two layers nor as stratigraphically distinct from the second layer as the second layer was from the first. A 2 to 3 cm thick layer of charcoal immediately underlay the third layer of rocks. This charcoal layer also contained large charred branch fragments, some of which were almost 25 cm long x 3 cm wide. The basin-shaped floor under this charcoal layer was clearly stratigraphically distinct from the underlying nonfeature matrix. The contact between the feature bottom and the underlying matrix was lightly oxidized throughout. No ash was observed in the feature.

The sequential pattern of rocks overlying charcoal and the presence of dense charcoal under the burned rocks suggest that the hearths were created by placing rocks onto a fire and smothering it before it burned to ash. It is not known whether the vertical sequence reflects a series of individual hearths or a single hearth with a complex structure that reflects an attempt to heat three layers of rock. However, the fact that the lowest layer of rock is the least structured implies that the upper layers were not constructed while the lowest fire was burning. This in turn weakly implies that three separate (albeit closely spaced) construction/burning episodes are represented in F 2. The feature was intact, and some of the outer rocks and charcoal were still present in the test pit profile.

Two statistically identical radiocarbon ages on charcoal were obtained from near the top and just below the base of F 2, supporting the interpretation that the feature was constructed over a short period. One of these ages was obtained from Level 11, near the top of the feature. It yielded a corrected age of 1240 ± 60 BP (Beta b-70027). A second age of 1260 ± 60 BP (Beta b-70565) was obtained from charcoal recovered from Level 18, near the base of the feature. In addition to the charcoal ages from Level 11 and Level 18, chronometric information of the age of the feature is also provided by a series of nine A/I ratios on *Rabdotus* sp. from Level 11. The correspondence between the independent radiocarbon age on charcoal and the A/I results is fairly close. While the A/I ratios of the snails varied from 0.0406 (radiocarbon-equivalent 1422 BP) to 0.102 (radiocarbon-equivalent 4287 BP), a cluster of four snails yielded statistically identical ratios of between 0.0406 and 0.0409, which equate to an average radiocarbon-equivalent of 1430 BP. While the 200-odd-year difference between the radiocarbon ages and the A/I ratio does indicate

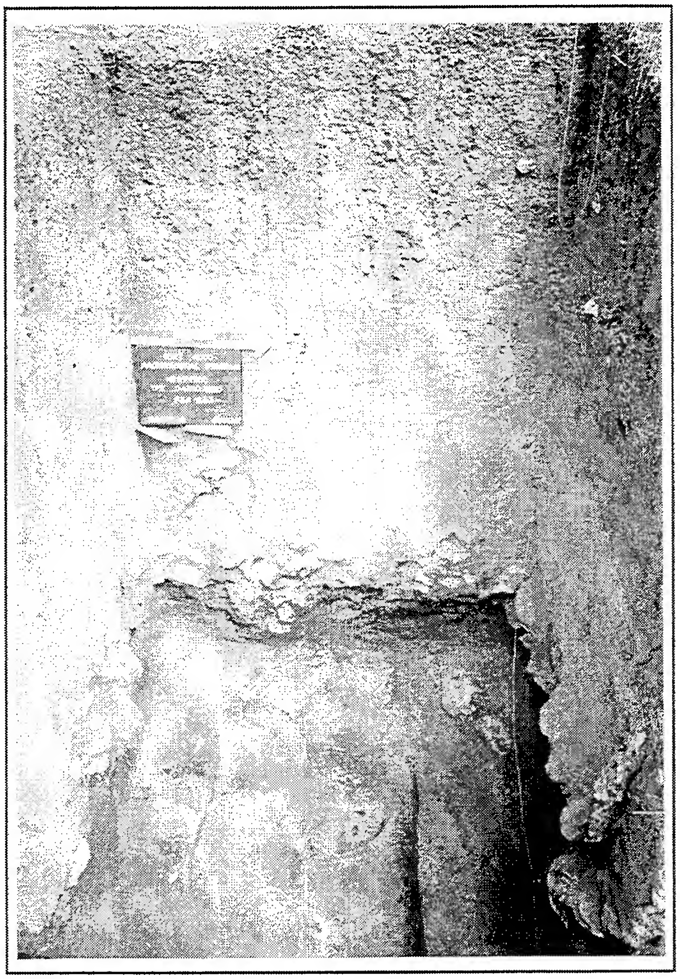

Figure 6.138 Profile of TP 2, Showing Fs 2 and 3, 41CV1200, Looking West.

that an initial age anomaly may be a factor, the 5% error range of the A/I ratios from the cluster overlaps the ^{14}C age at 2σ, and is very close to the 1σ spread of the radiocarbon age, suggesting that the two independent age assessments are almost statistically identical.

Another hearth (F 3; see Figure 6.137) was encountered 11 cm below the base of F 2, and extended from 185 to 240 cmbs (Figure 6.139). Several unburned rocks, oxidized soil, and charcoal were associated with this feature. Although the feature extended beyond the limits of TP 2, an approximate diameter of 1.2 m was suggested by the exposed portion. The surface of the hearth contained a semicircular zone of charcoal and ash flecking. Fifteen limestone slabs (14 of which were tabular and only one of which was burned) lay near the surface of the feature. These rocks were not placed in any apparent pattern and lay at irregular angles relative to each other and the feature. The main portion of F 3 was a pit approximately 50 cm deep and lined by an oxidation rind, almost 3 cm thick in some places, which contained a thick ash zone in the center. Further excavation of F 3 from 195 to 225 cmbs was limited to the 30 cm wide trench in order to preserve the oxidation rind for archeomagnetic dating. This trench revealed a combination of oxidized earth, ash, and clay-silt lenses that may represent different firing episodes. The high proportion of ash in the fill suggests that fires in

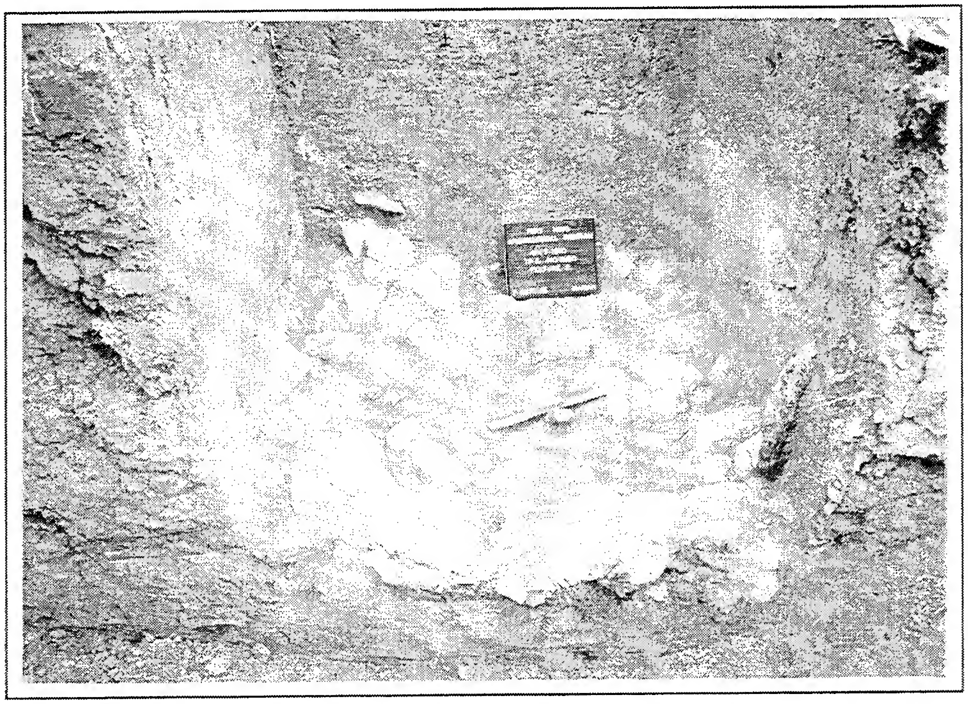

Figure 6.139 Feature 2, 41CV1200, Looking West.

the hearth were allowed to burn out before they were buried. The fact that most of the slabs at the surface of the feature were unburned implies that their association with the functioning of F 3 is weak. At the western edge of the feature, within the 30 cm wide trench, a 30 to 40 cm deep vertical hole, completely filled with ash, was observed. It could not be determined if the walls of the hole were oxidized, and it is probable that the hole is a rodent burrow. The feature may have been minimally impacted by faunal activity, but was otherwise intact.

The nondebitage lithic assemblage consists of three tools: a preform, side scraper (identified as Cowhouse Mottled/Flecked chert), and a utilized flake (indeterminate light brown chert).

A moderately sized debitage assemblage, consisting of nine identified chert types and eight indeterminate chert categories, was recovered from the site (Table 6.186). Approximately 25% of the overall assemblage was identified. When the entire assemblage was considered, the aggregate indeterminates occurred in greater than expected frequency and all of the identified types occur in less than expected frequency. When the indeterminates are excluded, all of the identified types occur in expected frequency (Table 6.187).

All four recognized chert provinces are represented in the assemblage. The most strongly represented (56% of the identified total) is the local Cowhouse province, which is represented by four varieties (Heiner Lake Translucent Brown, Cowhouse Dark Gray, Cowhouse Mottled/Banded, and Cowhouse Striated). North Fort is represented by three varieties (Fort Hood Yellow, Fort Hood Gray, and Owl Creek Black) that make up 26% of the overall assemblage Southeast Range by one type (Heiner Lake Tan) that makes up 15%, and West Fort by a single flake of Anderson Mountain Gray (4%).

Although the modal peak in debitage size is in the 0.9 to 1.2 cm class, flake size is strongly variable, with significant counts in all size classes. This, coupled with the fact that only 60% of the assemblage is decortified (Table 6.188), suggests

that all stages of lithic reduction were practiced at the site. The high incidence of Cowhouse materials and the relatively high incidence of abraded cortex suggest that many of the materials reduced on site were probably obtained from the adjacent channel.

A moderate faunal assemblage, consisting primarily of unidentifiable fragments of artiodactyls and other deer-sized mammals, was recovered from the site. Identified taxa include bos/bison (which probably represents cow contained in historic sediments), deer, and turtle. A minimum of two distinct mussel taxa, representing relatively low current and firm to soft bottom conditions, were also recovered from the site (Table 6.189).

6.24.3 Conclusions and Recommendations

The degree of pedogenic development within the sediments at the site is consistent with that described by Nordt (1992) for either the West Range or the Ford alluvium, although the radiocarbon information from the cultural strata suggest that the body of the fill is of upper West Range affiliation. All of the cultural occupations were situated within overbank facies, which suggests that minimal disturbance occurred during the burial process.

Table 6.186 Debitage Recovery by Size and Material Type, AU 1, 41CV1200.

	Size (cm)						
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types							
03-AM Gray	0	0	0	0	0	1	1
06-HL Tan	0	0	0	3	1	0	4
08-FH Yellow	0	0	0	2	0	0	2
09-HL Tr Brown	0	0	0	3	1	1	5
14-FH Gray	0	0	0	0	0	2	2
17-Owl Crk Black	0	0	2	0	1	0	3
19-C Dr Gray	0	0	0	0	2	4	6
23-C Mott/Banded	0	0	0	0	0	2	2
26-C Striated	0	0	0	0	1	1	2
Subtotal	*0*	*0*	*2*	*8*	*6*	*11*	*27*
Unidentified Types							
Indet Black	0	0	0	0	1	0	1
Indet Dk Brown	0	3	9	0	0	0	12
Indet Dk Gray	0	0	0	4	1	3	8
Indet Lt Brown	4	5	22	14	3	3	51
Indet Lt Gray	0	2	2	1	1	0	6
Indet Misc.	0	5	14	3	2	1	25
Indet Mottled	0	0	1	0	0	1	2
Indet White	0	0	3	0	0	0	3
Subtotal	*4*	*15*	*51*	*22*	*8*	*8*	*108*
Total	**4**	**15**	**53**	**30**	**14**	**19**	**135**

Table 6.187 Binomial Statistic Results, AU 1, 41CV1200.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
03-AM Gray	1	7	20	less	0	6	expected
06-HL Tan	4	7	20	less	0	6	expected
08-FH Yellow	2	7	20	less	0	6	expected
09-HL Tr Brown	5	7	20	less	0	6	expected
14-FH Gray	2	7	20	less	0	6	expected
17-Owl Crk Black	3	7	20	less	0	6	expected
19-C Dr Gray	6	7	20	less	0	6	expected
23-C Mott/Banded	2	7	20	less	0	6	expected
26-C Striated	2	7	20	less	0	6	expected
Total Indet	108	7	20	more	na	na	na

The site contains stratified assemblages that include intact features and other artifacts. Available chronometric data suggest that most of this material is of early Late Prehistoric age. In addition to features and assemblages observed during test excavations, the cutbank of the unnamed tributary shows that occupations are distributed relatively widely across the site. The preservation of bone, ash, and charcoal implies that the cultural materials at the site were rapidly buried. The site therefore contains assemblages composed of artifactual data in depositional conditions very well suited for technological studies according to the research design for Fort Hood (Ellis et al. 1994). The site also contains faunal materials (mussel shells and bone) that can contribute to subsistence studies specified in the research design. As a result, the site has high potential to provide insight into technological systems and decision-making processes that accompanied adaptively significant activities in an alluvial setting along a major drainage in the Fort Hood area. In addition, the site has geomorphic characteristics and faunal materials (land snails) relevant to the reconstruction of paleoclimate and paleolandscape processes. As a result, the site is significant with respect to its potential to contribute data for environmental problems central to the cultural ecological focus of the research design (Ellis 1994b).

On this basis, site 41CV1200 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the known eligible components are relatively deeply buried (greater than 40 cmbs), they are fairly well protected from training and other activities that affect only the surface of the site. However, traffic by heavy vehicles (tanks, armored personnel carriers, and heavy trucks) can have an adverse impact on shallower components, especially after periods of rainfall that leave the ground surface soft and vulnerable to deep penetration by wheels and tracks. Adverse impacts from uncontrolled excavations also pose substantial threats to this scientifically valuable site. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism; (2) prevent mechanical or manual excavations by military personnel; and (3) minimize the impact of traffic by heavy vehicles, especially when the ground is wet.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets

Table 6.188 Debitage Cortex Characteristics by Material Type, AU 1, 41CV1200.

	Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types						
03-AM Gray	0	1	0	0	0	1
06-HL Tan	1	0	0	3	0	4
08-FH Yellow	0	0	0	2	0	2
09-HL Tr Brown	1	0	0	4	0	5
14-FH Gray	1	1	0	0	0	2
17-Owl Crk Black	0	0	0	3	0	3
19-C Dr Gray	6	0	0	0	0	6
23-C Mott/Banded	2	0	0	0	0	2
26-C Striated	0	0	0	2	0	2
Subtotal	*11*	*2*	*0*	*14*	*0*	*27*
Unidentified Types						
Indet Black	1	0	0	0	0	1
Indet Dk Brown	0	0	2	10	0	12
Indet Dk Gray	3	1	2	2	0	8
Indet Lt Brown	5	3	10	33	0	51
Indet Lt Gray	0	0	1	5	0	6
Indet Misc.	1	1	6	15	2	25
Indet Mottled	0	1	0	0	1	2
Indet White	0	0	0	1	2	3
Subtotal	*10*	*6*	*21*	*66*	*5*	*108*
Total	**21**	**8**	**21**	**80**	**5**	**135**

Table 6.189 Faunal Recovery, AU 1, 41CV1200.

	Element											
Vertebrates	Antler	Femur	Fused 3&4th metata	Indeterminate	Metapodial	Pelvis	Proximal Phalange	Rib	Carapace	left	right	Total
Artiodactyla	0	1	3	0	1	0	0	0	0	0	0	5
Bos/Bison	0	0	0	0	0	0	0	1	0	0	0	1
Mammalia	0	0	0	2	0	0	0	0	0	0	0	2
Mammalia (med/lg)	0	0	0	31	0	0	0	0	0	0	0	31
Mammalia (very lg)	0	0	0	2	0	0	0	0	0	0	0	2
Odocoileus sp.	1	0	0	0	0	1	1	0	0	0	0	3
Testudinata	0	0	0	0	0	0	0	0	3	0	0	3
Vertebrata	0	0	0	7	0	0	0	0	0	0	0	7
Total	**1**	**1**	**3**	**42**	**1**	**1**	**1**	**1**	**3**	**0**	**0**	**54**
Bivalves												
Lampsilinae	0	0	0	0	0	0	0	0	0	1	2	3
Lampsilis sp.	0	0	0	0	0	0	0	0	0	4	0	4
Toxolasma sp.	0	0	0	0	0	0	0	0	0	1	0	1
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**2**	**8**

delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 100 m^2 in area. Data recovery also should involve extensive mechanical trenching to provide geoarcheological profiles and to sound for currently unknown occupations. Potential mitigation efforts should concentrate on deposits 30 to 80 cmbs in the vicinity of TP 1 and 100 to 200 cmbs in the vicinity of TP 2. Assuming blocks of approximately 35 m^2, mitigation excavations in these two areas would involve about 70 m^2 of manual excavations. Assuming that another cultural zone 50 cm thick is located during prospection (e.g., near occupations visible in the cutbank), another 15 m^2 of manual excavation would be necessary, for a total of approximately 85 m^2. These estimates assume that overburden will be removed by carefully executed mechanical excavations to avoid wasting valuable resources on unproductive manual excavations in uninformative contexts. Because unknown, intact, buried occupations may occur at elevations higher than the known occupations, overburden removal should be carefully monitored. Discovery of such occupations would increase mitigation requirements by an unknown amount.

The total mitigation volume estimated above also does not include potential intact deposits that may be present at greater depths. Excavations were terminated at the base of tributary deposits that may equate to the West Range alluvium and older

deposits that equate to uncertain units in Nordt's (1992) description of fills in Cowhouse Creek. As a result, test excavations did not explore stratigraphic contexts that could contain Early Archaic components that have been rarely excavated in Central Texas and may occur rarely at Fort Hood. Therefore, it is not known if significant intact deposits are present in deep stratigraphy. Hence, if mitigation is required, it will be necessary to prospect for deeply buried cultural components that may add an unknown volume of manual excavations to the amount estimated above to mitigate the site. However, sounding for deeply buried components will involve mechanical excavation that could severely compromise known intact deposits. Consequently, if mitigation is required, it will be necessary to perform mitigation and sounding excavations in a carefully coordinated sequence that minimizes damage to known, scientifically productive contexts and maximizes effectiveness of subsurface prospection.

Given that the thickness of the distal overbank facies varies significantly between the two trenches, future work should include excavation and description of at least two trenches perpendicular to each other across the entire meander (preferably one roughly east-west and another roughly north-south) in order to clearly elucidate the macrogeometry of the depositional environments present at this site and to provide context for block excavations.

6.25 SITE 41CV1391

6.25.1 Introduction

In July 1993, Mariah conducted test excavations at site 41CV1391. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.25.1.1 Location and Description

Site 41CV1391 is located between two unnamed tributaries of House Creek (Figure 6.140). The topography of the site is dominated by a deflated upland surface with a narrow alluvial terrace along the east side of the site, and a wedge of Paluxy Sand deposits on the northwest side (Figure 6.141). A colluvial toeslope lies between the alluvial deposits and the slope to the upland surface. Tank trails are nearly ubiquitous throughout the site, and the flat upland surface has been ground to oblivion beneath countless treads. Maximum site dimensions are 240 x 390 m (about 93,600 m^2, or 23 acres). For purposes of this report, the site is considered a member of the Turkey Run site group.

6.25.1.2 Previous Work

This site was initially recorded as two burned rock mounds by Masson, Strychalski, and Dureka in January 1987. Scattered burned rock, a low density of debitage, bone, and mussel shell were observed adjacent to the burned rock features. The mounds were noted as being approximately 250 m apart, with no cultural material being observed between them. The site was estimated to have 50 to 60 cm of soil deposits, composed of a dark, stony clay topsoil above a sandy subsoil. The site was estimated to be 75% disturbed by vehicular traffic, erosion, bivouac activity, and animals.

Abbott and Oglesby revisited the site on 14 February 1992 and reevaluated the site based on archeological and geomorphic observations. The site was divided into Subarea A (the deflated upland) and Subarea B (the alluvial terrace) on the basis of geomorphic contexts and the potential for intact cultural deposits. The two burned rock mounds identified on the initial survey were relocated and shovel tests were excavated on each feature. Two shovel tests were also excavated within Subarea B. The results of shovel testing suggested that the burned rock mounds were shallow, deflated, and unlikely to contain intact deposits. However, burned rock was recovered

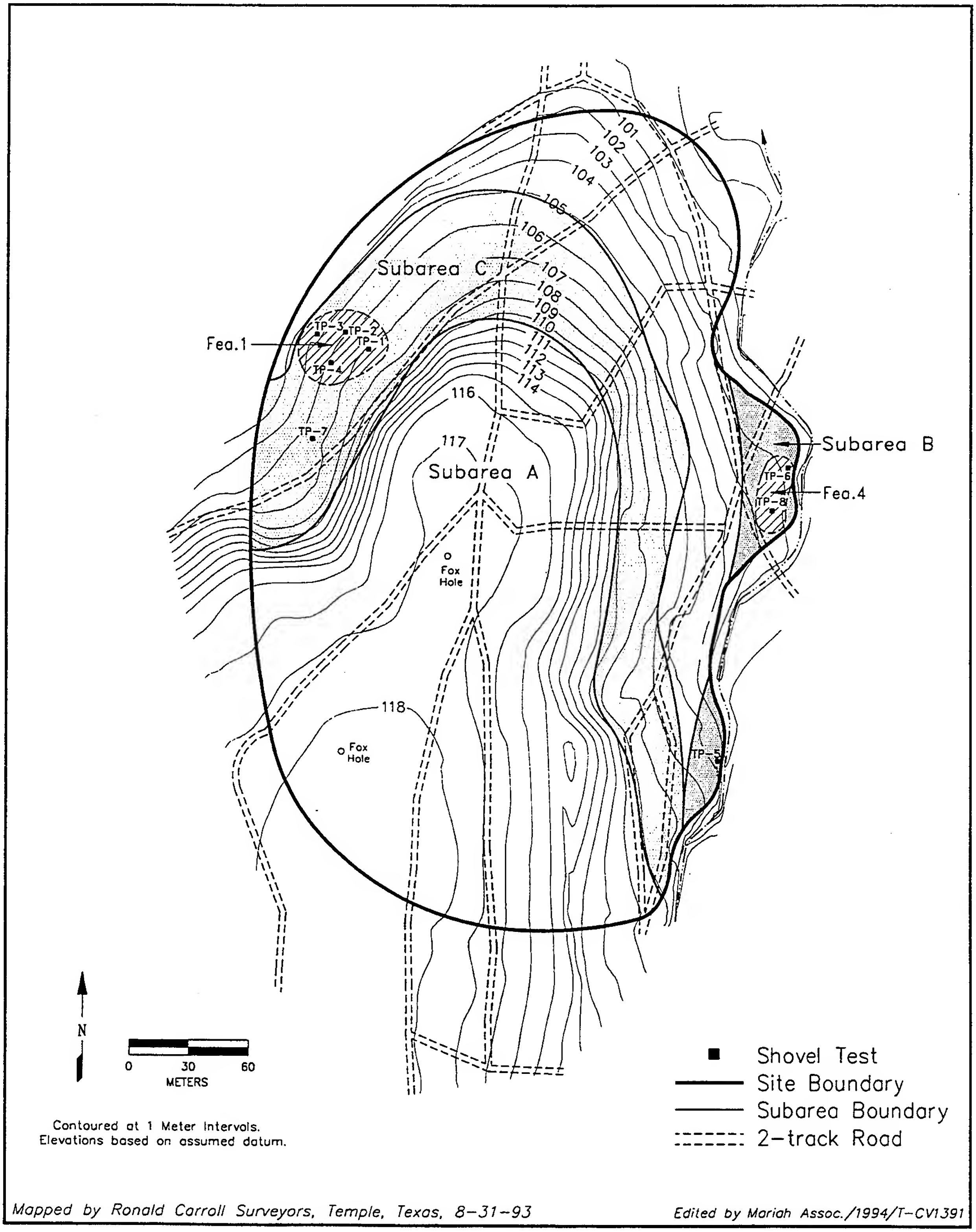

Figure 6.140 Site Map of 41CV1391.

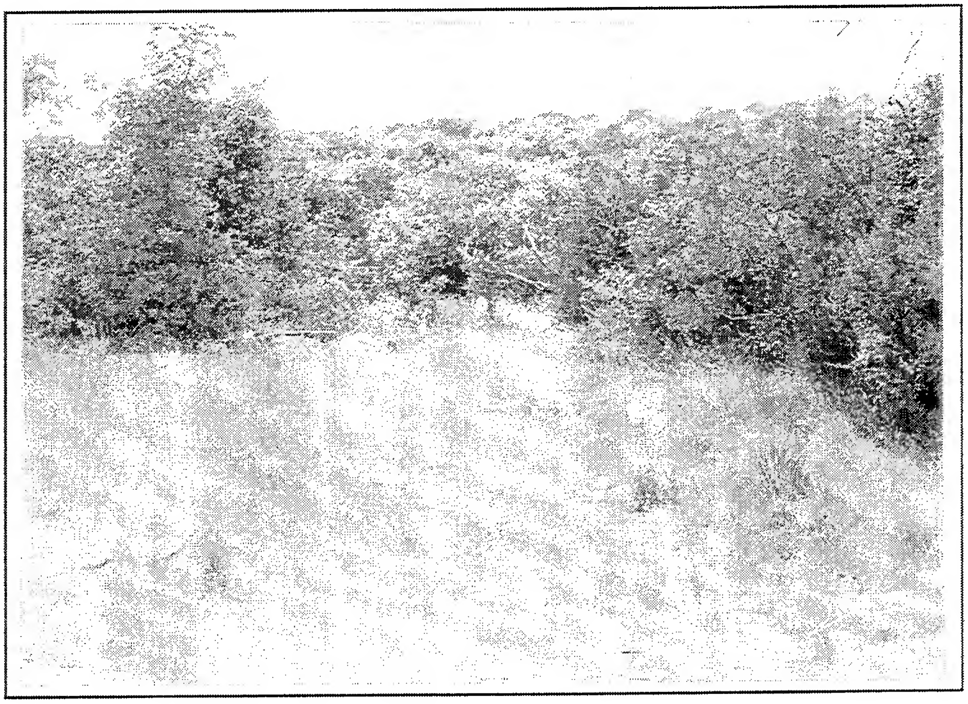

Figure 6.141 Overview of Site 41CV1391, Looking West.

shovel testing, no further management was recommended for Subarea A, but the archeological potential of Subarea B was uncertain. Subarea B was recommended for avoidance or for formal testing if avoidance was not possible. Two 1 x 1 m of manually excavated test pits and two backhoe trenches were recommended to determine NRHP eligibility (Trierweiler 1994:A1517-A1519).

6.25.1.3 New Work

During this testing phase, a third subarea (Subarea C) was defined to encompass a colluvial/slopewash deposit of fine-grained quartz sand on the lower slopes of the landform. Although no Paluxy bedrock was identified on site, this sediment is similar to slopewash associated with Paluxy outcrops. Therefore, the sediment is interpreted to be the result of weathering of multiple thin sandstone beds in the upper Glen Rose that equate to the farthest extent of the terrigenous sands that, when thicker, compose the Paluxy Formation. This sand deposit is very shallow on the eastern slope of the site. A thicker deposit of the sand was located at the northwest portion of the site, surrounding one of the previously identified features (F 1). No trenches were excavated at the site.

Three test pits (TPs 5, 6, and 8) were excavated within the alluvial terrace of Subarea B, and five test pits (TPs 1 through 4 and 7) were excavated within the Paluxy Sand deposit of Subarea C (Table 6.190). Within Subarea C, TPs 2, 3, and 4 were placed near F 1, a burned rock midden observed eroding from a road cut. Test pits 1 and 7 were placed on the margins of the deposit to test for the presence of occupations buried away from the feature. Recovered cultural material is summarized in Table 6.191.

6.25.2 Results

To facilitate analysis, two analytical units were defined on 41CV1391. Analytical unit 1 subsumes excavations on the alluvial terrace, and AU 2

subsumes excavations in the sandy "Paluxy" colluvial apron.

6.25.2.1 Excavations in the Terrace

The alluvial terrace is underlain by relatively thin, graded alluvial deposits exhibiting an A-Bw-C profile. The upper, fine-grained material varies from sandy loam to loam, and is dark grayish brown (10YR 4/2) in the A horizon and brown (10YR 5/3) in the B horizon. Although partially obscured by pedogenesis, some primary stratification is preserved in the top stratum, suggesting that it was deposited relatively recently. Test pit 5 was placed at the southern edge of the terrace and excavated to dense gravels at 80 cmbs. Cultural material recovered from TP 5 consisted of a total of seven burned rocks from 10 to 50 cmbs. No other cultural material was recovered.

Test pit 6 was placed on the northern portion of the terrace and excavated to 150 cmbs. Cultural material recovered from TP 6 included relatively low frequencies of flakes and burned rocks from 40 to 130 cmbs. The vertical distribution of these artifacts was fairly uniform except for a concentration of burned rocks (F 3) located at 99 to 106 cmbs. Feature 3 (Figure 6.142) was composed of 20 burned rocks (7 kg), ranging from 5 x 4 cm to 13 x 10 cm in size, concentrated at the western edge of TP 6, and three larger, burned tabular rocks, averaging 18 x 12 cm in size, at the eastern edge of the pit. No artifacts were directly associated with the feature, but charcoal flecking was observed adjacent to the rocks and at the northeast corner of the pit. Because of the limitations imposed by excavating small, vertical units in burned rock features, it could not be determined if F 3 was actually two separate small features (possibly hearths) or part of a single, larger burned rock feature. No evidence of stratigraphic disturbance was visible in this unit, and the vertically limited occurrence of burned rock and peak lithic-artifact frequencies implies the presence of a discrete occupational zone.

Table 6.190 List of Treatment Units, 41CV1391.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	TP 5	1.0	1.0	80
1	TP 6	1.0	1.0	150
1	TP 8	1.0	1.0	60
2	TP 1	1.0	1.0	50
2	TP 2	1.0	1.0	70
2	TP 3	1.0	1.0	50
2	TP 4	1.0	1.0	70
2	TP 7	1.0	1.0	40

Test pit 8 was placed between TPs 5 and 6 and excavated to dense gravels at 60 cmbs. This test pit was sterile.

No tools or faunal remains were recovered from this AU. Recovered debitage was limited to 13 flakes from TP 6. Only one of these flakes was a recognized type (Table Rock Flat) one was an indeterminate mottled variety, and the remainder were indeterminate light brown. All were decortified and size ranged from 0.5 cm to 2.6 cm.

6.25.2.2 Excavations in the Paluxy Colluvium

The sandy slopewash deposits of AU 2 are composed of calcareous, grayish-brown (10YR 5.2) to brown (10YR 5/3) fine sandy loam to loamy sand, and typically exhibit an A-C or C profile, suggesting that the deposits are relatively recent. Test pit 3 was placed just north of the exposed portion of F 1. Small scattered burned rocks and a few flakes were recovered from the upper 10 cm, and a few flakes and five small burned rocks (0.25 kg) were found from 10 to 20 cmbs. The cultural material recovered from 0 to 20 cmbs probably represents the northern fringe of F 1. Charcoal, possibly from in situ burned roots, was observed from 10 to 20 cmbs. No cultural material was found from 20 to 50 cmbs. Bedrock was encountered at 50 cmbs.

Table 6.191 Artifact Recovery by Test Pit, 41CV1391.

	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	0	1	0(0)	0	0	53	0	450(9.0)	0	0	0	0	0(0)	0	0	2	2	271(11.5)
2	0	0	2	0	0(0)	0	0	70	3	1500(24.0)	0	0	4	0	5(.25)	0	0	5	0	1200(57.0)
3	0	0	0	0	9(0)	0	0	47	3	1900(35.0)	0	0	4	0	0(0)	0	0	2	0	548(20.0)
4	0	0	0	0	0(0)	0	0	21	0	600(12.0)	0	0	0	0	0(0)	0	0	3	0	27(2.5)
5	0	0	0	0	0(0)	0	0	12	1	210(8.0)	0	0	0	0	0(0)	0	0	2	0	0(0)
6						0	0	2	0	8(2.0)	0	0	0	0	0(0)	0	0	0	0	0(0)
7						0	0	0	0	0(0)						0	0	0	0	0(0)
8																0	0	0	0	0(0)
9																				
10																				
11																				
12																				
13																				
14																				
15																				
TOTAL	0	0	2	1	9(<0.1)	0	0	205	7	4668(90)	0	0	8	0	5(0.25)	0	0	14	2	2046(91)

	TEST PIT 5					TEST PIT 6					TEST PIT 7					TEST PIT 8			
LEVEL	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	1	0(0)	0	0	0	0(0)
2	0	0	0	0	2(.25)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0(0)
3	0	0	0	0	1(.25)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0(0)
4	0	0	0	0	1(.25)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0(0)
5	0	0	0	0	2(.25)	0	0	0	0	2(.25)						0	0	0	0(0)
6	0	0	0	0	0(0)	0	0	2	0	7(.2)						0	0	0	0(0)
7	0	0	0	0	0(0)	0	0	0	0	5(.5)									
8	0	0	0	0	0(0)	0	0	1	0	2(.1)									
9						0	0	4	0	0(0)									
10						0	0	3	0	0(0)									
11						0	0	0	0	20(7.0)									
12						0	0	0	0	5(.5)									
13						0	0	2	0	0(0)									
14						0	0	0	0	0(0)									
15						0	0	0	0	0(0)									
TOTAL	0	0	0	0	6(1.0)	0	0	12	0	41(8.55)	0	0	0	1	0(0)	0	0	0	0(0)

Test pit 2 (Figure 6.143) was placed approximately 10 m northeast of the exposed portion of the burned rock midden (F 1). The top 5 to 15 cm of the pit consisted of recent slopewash sands and contained recent historic materials. Feature 1 was present in Levels 1 through 4, and an internal hearth (F 2) was located in the lower portion of the midden (at about 35 to 53 cmbs). Only the northwest portion of F 2 was within TP 2; the remaining portion extended into the south and east test pit walls. Numerous flakes (many heat altered), an untyped arrow point, and an abundance of burned rocks were recovered from the levels containing the features. At 60 cmbs, only a small area at the southeast corner was excavated to 100 cmbs, and bedrock was exposed throughout the remainder of the pit. From 60 to 70 cmbs, dark gray (10YR 4/1) sand containing a few burned rocks was observed. It could not be determined whether this zone represents a separate occupation or if it is the result of natural disturbances (i.e., rodent activity). No cultural material was found

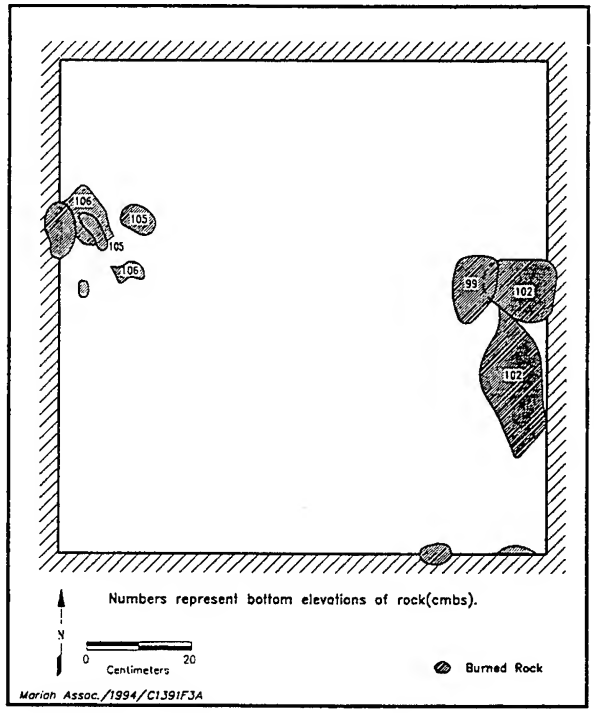

Figure 6.142 Plan of F 3 (110 cmbs), TP 6, 41CV1391.

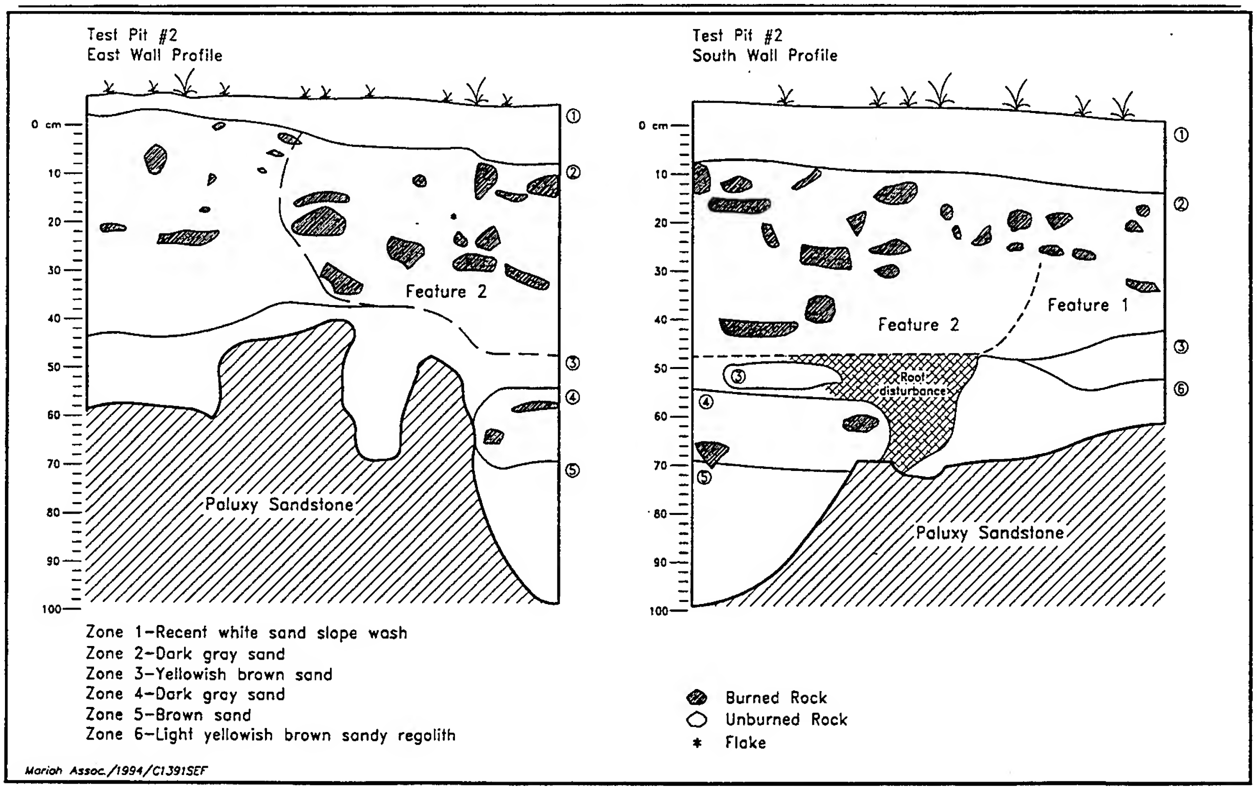

Figure 6.143 Profiles of East and South Walls, TP 2, 41CV1391.

from 70 to 100 cmbs within the small depression at the southeast corner of TP 2. One radiocarbon age of 1031 ± 34 BP (TX-8188) was obtained from Level 4, near the base of the feature.

Test pit 4 (Figure 6.144) was placed approximately 7 m south of the exposed portion of F 1. The top few centimeters of the pit were composed of recent slope-washed sand that contained several military shell casings. The top of the burned rock midden (designated F 1A) was encountered at the datum elevation (ground surface at the southwest corner of the test pit), at the eastern edge of the unit, and at 18 cmbs at the western edge of the unit. The base of the feature was reached at 40 cmbs. Cultural material recovered from each level excavated in F 1A included a few flakes and an abundance of burned rocks. In addition to these artifacts, a Darl point was found in situ at 5 cmbs, and a radiocarbon age of 1760 ± 100 BP (Beta b-75165) was obtained on charcoal from Level 3. This portion of the profile appears to be in an A-C horizon that reflects a high degree of sediment mobilization during occupation and localized disturbance of the underlying 2Ab horizon. Below F 1A, a couple of flakes were found from 40 to 50 cmbs, and no cultural material was located from 50 to 70 cmbs. Bedrock was encountered at 70 cmbs.

The eroded portion of F 1 within the trail, F 1 within TP 2, and F 1A within TP 4 appear to be one contiguous burned rock midden with at least one internal hearth (F 2). Based on these three exposures, F 1 is at least 17 to 20 m long x 8 to 12 m wide x 40 cm thick (0 to 40 cmbs), with F 2 extending to 53 cmbs. Surficial disturbance appears to be confined to the top few centimeters for most of the feature, with some damage from vehicles to depths of up to 15 cm. The lower portion appears to have been only minimally disturbed by roots and rodents.

Feature 1 fill ranged from tabular slabs up to 10 cm in size and smaller, angular burned rocks in a black, charcoal-stained sandy matrix within TP 2, to larger tabular slabs (15 cm diameter) and angular burned rocks within a charcoal-flecked,

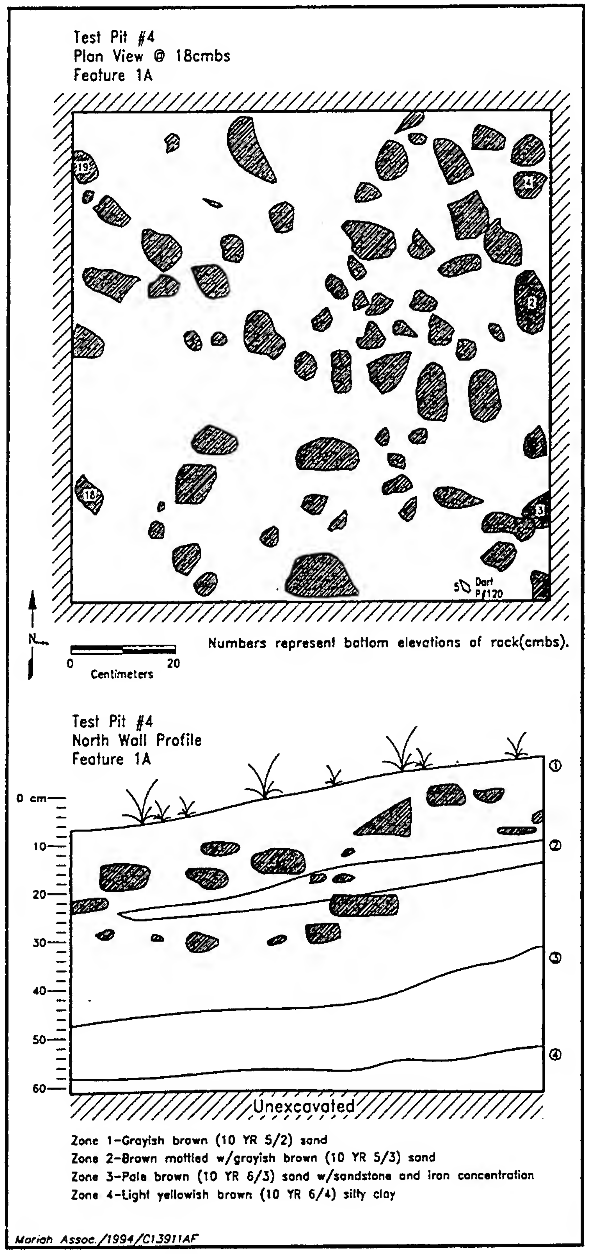

Figure 6.144 Plan of F 1A, TP 4, and Profile of North Wall, TP 4, Showing F 1A in Section, 41CV1391.

brown sandy matrix in TP 4. The varying degree of charcoal staining is most likely due to the proximity to internal features (hearths) and, possibly, to partial replacement of midden fill by fine Paluxy sediments. Density of burned rock in TP 2 ranged from a low of 450 pieces (9 kg)

within the upper 10 cm to approximately 1,900 pieces (35 kg) from 20 to 30 cmbs. In TP 4, burned rock ranged from less than 30 pieces (2.5 kg) at 30 to 40 cmbs to about 1,200 pieces (57 kg) at 10 to 20 cmbs. In general, burned rock frequency is relatively low at the top, reaches a peak in the middle elevations, and drops off again in the lower levels. High frequencies of lithic debitage (many heat altered) were recovered from TP 2 and low amounts were found in TP 4, suggesting differing activities at spatially separated areas of the feature (i.e., lithic modification associated with the internal hearth F 2).

Within F 2, dense, tabular burned limestone (n=93, 8 kg) lay angled vertically down into an ovate basin. Black charcoal-stained sand formed the fine matrix among the rocks and in the basin. This fill extended upward into the overlying midden fill. Although the lower boundaries of F 2 were easily recognized, the upper edges were difficult to discern because F 1 grades into F 2. This suggests that F 2 was probably used during and in conjunction with formation of nearby midden deposits, and then buried by subsequent midden formation. The base of the hearth extended a few centimeters into a small natural bedrock depression. Artifact recovery rates ranged from very low to high in levels excavated in midden contexts, and were modest in the F 2 fill itself.

Test pit 1 was placed near the eastern (upslope) edge of the Paluxy Sand deposit. Only a few flakes were recovered from this pit from the upper 20 cm. Weathered bedrock was encountered at 50 cmbs. Test pit 7 was placed at the southern edge of the Paluxy Sand deposit. A single flake and a couple of military shell casings were recovered from the upper 10 cm of this test pit. Bedrock was encountered at 40 cmbs.

Two projectile points were recovered from the excavations on the Paluxy terrace; a Darl of indeterminate light gray chert, and an untyped arrow point of miscellaneous indeterminate chert. Nine additional nondebitage lithic specimens were recovered from this AU (Table 6.192). They include a multiple platform core, two bifacial tools, and six unifacial tools.

A moderately sized debitage assemblage was recovered from AU 2. Most of the material (roughly 90%) was recovered from TP 2 and consisted of seven identified chert types and six indeterminate chert categories (Table 6.193). Overall, only 7% of the assemblage was identified. As a result, the indeterminates occurred in greater than expected frequency and all identified types occurred in less than expected frequency when the entire assemblage was considered, while all types occurred in the expected range when the indeterminates were excluded (Table 6.194).

Three of the four recognized chert provinces are represented in the assemblage. Southeast Range types (Cowhouse White, Heiner Lake Translucent Brown, and Heiner Lake Blue) and West Fort types (Anderson Mountain Gray) make up the largest fraction, with 41% and 35%, respectively, while North Fort types (Fort Hood Yellow and Owl Creek Black) make up 24%. Three-quarters of the assemblage is between 0.5 and 1.2 cm in size, suggesting latter-stage reduction and/or the reduction of relatively small nuclei, which is unsurprising given the distance to the chert sources (approximately 5 to 20 km, with West Fort sources closest) (Table 6.193). However, despite these distances, fully 18% of the assemblage are cortical flakes, suggesting that some early-stage reduction is represented (Table 6.195).

No faunal material was recovered from AU 2. Macrobotanical remains were limited to charred live oak wood from the fill of F 2 (TP 2, Level 4).

6.25.3 Conclusions and Recommendations

If the burned rock and other materials observed in TPs 2 through 4 of Subarea C belong to F 1, then it is a substantial and largely intact burned rock midden. The presence of F 2 below F 1 in TP 2 implies either that identifiable internal features may be located within F 1, or that stratified burned rock features may occur within the Paluxy deposits at

the site. If the cultural materials in TPs 2 through 4 are not part of the same feature, then the area around F 1 contains a series of discrete burned rock features. In either event, these possibilities make the area around F 1 extremely valuable with respect to current issues in burned rock midden research in general (Howard 1991; Collins 1991; Ellis 1994a) and issues of prehistoric burned rock technologies specified in the Fort Hood research design (Ellis 1994b).

Furthermore, there are reasons to believe that middens in Paluxy Sand contexts are behaviorally unusual phenomena. Middens in Paluxy contexts appear generally: (1) to have low frequencies of artifacts other than burned rock, (2) to involve transportation of limestone onto the Paluxy surface, and (3) to occur preferentially on Paluxy surfaces rather than on adjacent non-Paluxy surfaces. Still further, there are substantial noncultural depositional contexts on the Paluxy surface which have high potential to yield crucial data for geoarcheological studies relevant to the reconstruction of paleoclimate and paleo-topography, both of which are important environmental issues in the Fort Hood research design. Subarea C, therefore, has high archeological potential with respect to providing data for scientifically important burned rock midden studies, paleoenvironmental studies, and general studies of hunter-gatherer adaptation at Fort Hood.

The portion of Subarea B around TP 6 appears to contain evidence of a stratigraphically discrete occupational zone. Although the frequencies of artifacts other than burned rock are relatively low, the association of artifacts with an apparently intact burned rock feature in good context comprises the kind of data base needed to perform technological analyses according to parameters established in the Fort Hood research design. The portion of Subarea B near TP 6 therefore has high archeological potential.

Based on previous work, Subarea A has no archeologically significant assemblages in good

Table 6.192 Cores and Nonprojectile Point Lithic Tools, AU 1, 41CV1391.

	Core Type	Tool Type			
Lithic Material	multiple platform	early stage biface	end scraper	side scraper	Total
06-HL Tan	1	0	0	0	1
Indet Dk Brown	0	0	0	1	1
Indet Dk Gray	0	0	1	0	1
Indet Lt Brown	0	2	1	0	3
Indet Lt Gray	0	0	0	3	3
Total	**1**	**2**	**2**	**4**	**9**

Table 6.193 Debitage Recovery by Size and Material Type, AU 1, 41CV1391.

	Size (cm)						
Lithic Material	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types							
02-C White	0	0	0	0	1	0	1
03-AM Gray	0	0	1	4	1	0	6
06-HL Tan	0	0	0	0	0	1	1
08-FH Yellow	0	1	1	1	0	0	3
09-HL Tr Brown	0	0	1	0	2	0	3
10-HL Blue	0	1	0	1	0	0	2
17-Owl Crk Black	0	0	1	0	0	0	1
Subtotal	*0*	*2*	*4*	*6*	*4*	*1*	*17*
Unidentified Types							
Indet Dk Brown	0	13	5	0	1	0	19
Indet Dk Gray	0	4	2	0	0	1	7
Indet Lt Brown	1	67	60	24	7	3	162
Indet Lt Gray	1	10	4	3	0	0	18
Indet Trans	0	0	0	2	0	0	2
Indet White	0	0	2	1	0	0	3
Subtotal	*2*	*94*	*73*	*30*	*8*	*4*	*211*
Total	**2**	**96**	**77**	**36**	**12**	**5**	**228**

Table 6.194 Binomial Statistic Results, AU 1, 41CV1391.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	1	19	38	less	0	6	expected
03-AM Gray	6	19	38	less	0	6	expected
06-HL Tan	1	19	38	less	0	6	expected
08-FH Yellow	3	19	38	less	0	6	expected
09-HL Tr Brown	3	19	38	less	0	6	expected
10-HL Blue	2	19	38	less	0	6	expected
17-Owl Crk Black	1	19	38	less	0	6	expected
Total Indet	211	19	38	more	na	na	na

context. However, portions of the colluvial slope and toeslope on the eastern side of the site contain geomorphic evidence that may be very useful for reconstructing paleoenvironmental and paleoclimatic conditions in the Fort Hood area. Subarea A, therefore, has relevant geomorphic features with some research potential when conjoined with data from Subareas B and C.

On the basis of previous work at the site, the portions of Subarea A that remain after definition of Subarea C are judged to have low archeological potential and are ineligible for inclusion in the NRHP. No further management is recommended for Subarea A.

On the basis of testing, Subareas B and C of 41CV1391 are judged to be significant and eligible for inclusion in the NRHP. We recommend that the entire site be avoided and protected in order to avoid the loss of scientifically important information. Protective measures should include efforts to protect shallow deposits in Subarea C from surface damage by tracked and wheeled vehicles and by bivouac activities. Protective measures in Subarea B should include efforts to protect cultural deposits from surface impacts by heavy vehicles and from subsurface impacts resulting from excavations performed by vandals or by military personnel.

Table 6.195 Debitage Cortex Characteristics by Material Type, AU 1, 41CV1391.

	Partial Cortex				
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Total
Identified Types					
02-C White	0	0	0	1	1
03-AM Gray	0	0	0	6	6
06-HL Tan	0	0	0	1	1
08-FH Yellow	0	0	0	3	3
09-HL Tr Brown	0	1	1	1	3
10-HL Blue	0	0	0	2	2
17-Owl Crk Black	0	1	0	0	1
Subtotal	*0*	*2*	*1*	*14*	*17*
Unidentified Types					
Indet Dk Brown	0	0	1	18	19
Indet Dk Gray	1	0	0	6	7
Indet Lt Brown	1	9	25	127	162
Indet Lt Gray	0	1	0	17	18
Indet Trans	0	0	0	2	2
Indet White	0	0	0	3	3
Subtotal	*2*	*10*	*26*	*173*	*211*
Total	**2**	**12**	**27**	**187**	**228**

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets key data sets delineated in the overall research design for Fort Hood (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include backhoe trenches and up to 90 m^2 of manual excavations. Backhoe trenches should be used to delineate the subsurface extent of occupations in Subareas B and C and to provide exposures for geoarcheological data in all subareas. At least 40 m^2 of manual excavations should be allocated to cultural deposits on and near F 1, yielding approximately 22 m^2 of excavated volume. At least 25 m^2 of manual excavations should be allocated to deposits 50 to 150 cmbs in the area around TP 6, yielding another 25 m^2 of excavated volume. Carefully monitored mechanical excavations should be used to remove overburden. The remaining manual excavations should be allocated to prospection and data recovery near TP 1, TP 5, and TP 7, for an additional 13.5 m^2 of excavated volume and a total excavated volume of approximately 60.5 m^2.

6.26 SITE 41CV1400

6.26.1 Introduction

In early March 1994, Mariah conducted test excavations at site 41CV1400. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.26.1.1 Location and Description

Site 41CV1400 is located on the western side of Turkey Run Creek, south of Turkey Run Road (Figure 6.145). The site is bisected by an east trending minor tributary (Figure 6.146). Maximum site dimensions are 225 x 75 m (about 16,000 m^2, or 3.9 acres). For purposes of this report, the site is included in the Turkey Run site group.

6.26.1.2 Previous Work

This site was initially recorded by Masson, Rotunno, and Strychalski on 21 January 1986. Limited amounts of lithic debitage, scattered burned rock, and a mussel shell were observed along the western side of Turkey Run Creek and a Fresno arrow point was collected from the surface of the site. The site was estimated to be 55% disturbed by tracked vehicles, erosion, historic occupation, and military bivouac.

Lintz and Abbott revisited the site in March 1992 and reevaluated the site based on archeological and geomorphic observations. Although not formally subdivided, the site subsumed T_0, T_1, and T_2 terrace surfaces west of Turkey Run Creek. Minimal quantities of cultural material were observed on the site, but the boundary was extended approximately 50 m to the north during this visit to include a small dispersed burned rock concentration (F 1) found along the east side of a road cut. A widely dispersed burned rock scatter, noted by the initial investigators, was designated F 2, and a historic rock wall, located at the northern boundary of the site, was designated F 3. No further management was recommended on the T_0 surface due to lack of depth and indications of high depositional energy. Twelve shovel tests were excavated across the T_1 and T_2 to a depth of 40 cmbs. Five of these tests (42%) were positive, and within each, a single item was recovered from 0 to 30 cmbs. The upper 40 cm of the site was determined to have an extremely limited archeological potential; however, the possibility of deeply buried (greater than 40 cmbs) material remained. Because the site's archeological potential was uncertain, it was recommended for avoidance or for eligibility testing if avoidance was not possible. A minimum of three backhoe trenches was recommended for formal NRHP eligibility testing (Trierweiler 1994:A1522-A1523).

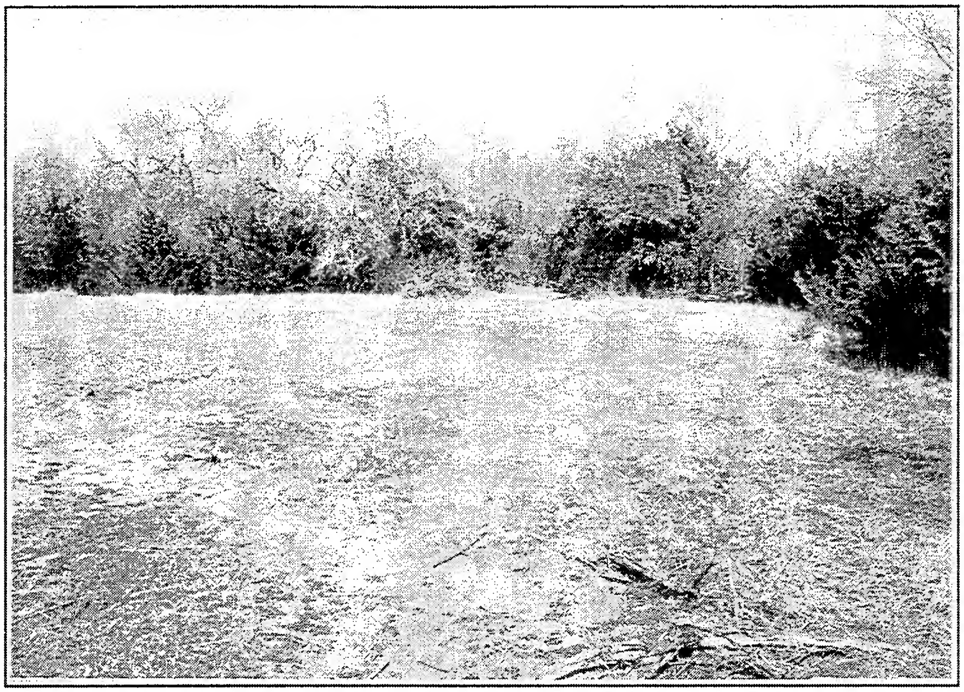

Figure 6.145 Overview of Site 41CV1400, Looking East.

6.26.1.3 New Work

Six trenches (BTs 1 through 6) were excavated to examine site stratigraphy and prospect for buried cultural material. Two of these trenches were placed completely on the T_1 surface, three were situated completely on the T_2 surface, and one long trench was placed spanning both the T_1 and T_2 (Table 6.196). Only BT 1, situated on the lower surface, and BT 4, situated on the higher surface, were recorded in detail. The others were examined for stratigraphic context and cultural material, and were briefly recorded by noting their similarities to, and differences from, BT 1 and BT 4. All of the trench walls were manually scraped with trowels to examine profiles for evidence of human occupations.

6.26.2 Results

The results of trenching indicate that both surfaces are underlain by Holocene-age sediments and should probably be designated T_{1A} and T_{1B} rather than T_2 and T_1. Deposits underlying the T_1 (T_{1B}) surface are typified by BT 1, which graded from very gravelly, high energy deposits near the modern channel to fine-grained, overbank deposits at the opposite end of the trench. One measured section was recorded at each end of the trench to account for this lateral variability. On the downslope end, the trench was excavated to a depth of approximately 135 cm and exhibited an A-C profile. The A horizon was 25 cm thick and consisted of very dark grayish brown (10YR 3/2), gravelly clay loam. It exhibited a moderate granular to weak platy structure, and appeared to represent predominantly slopewash deposition. Zone 2 extended to the base of the trench, and consisted of massive, clast-supported limestone gravels in a clayey sand matrix. The zone exhibited a few soft masses and thin clast pendants of calcium carbonate, and the color graded from dark grayish brown (10YR 4/2) to brown (10YR 5/3) with depth. No cultural material was observed. Similar profiles were noted in BT 2 and the downslope portion of BT 5.

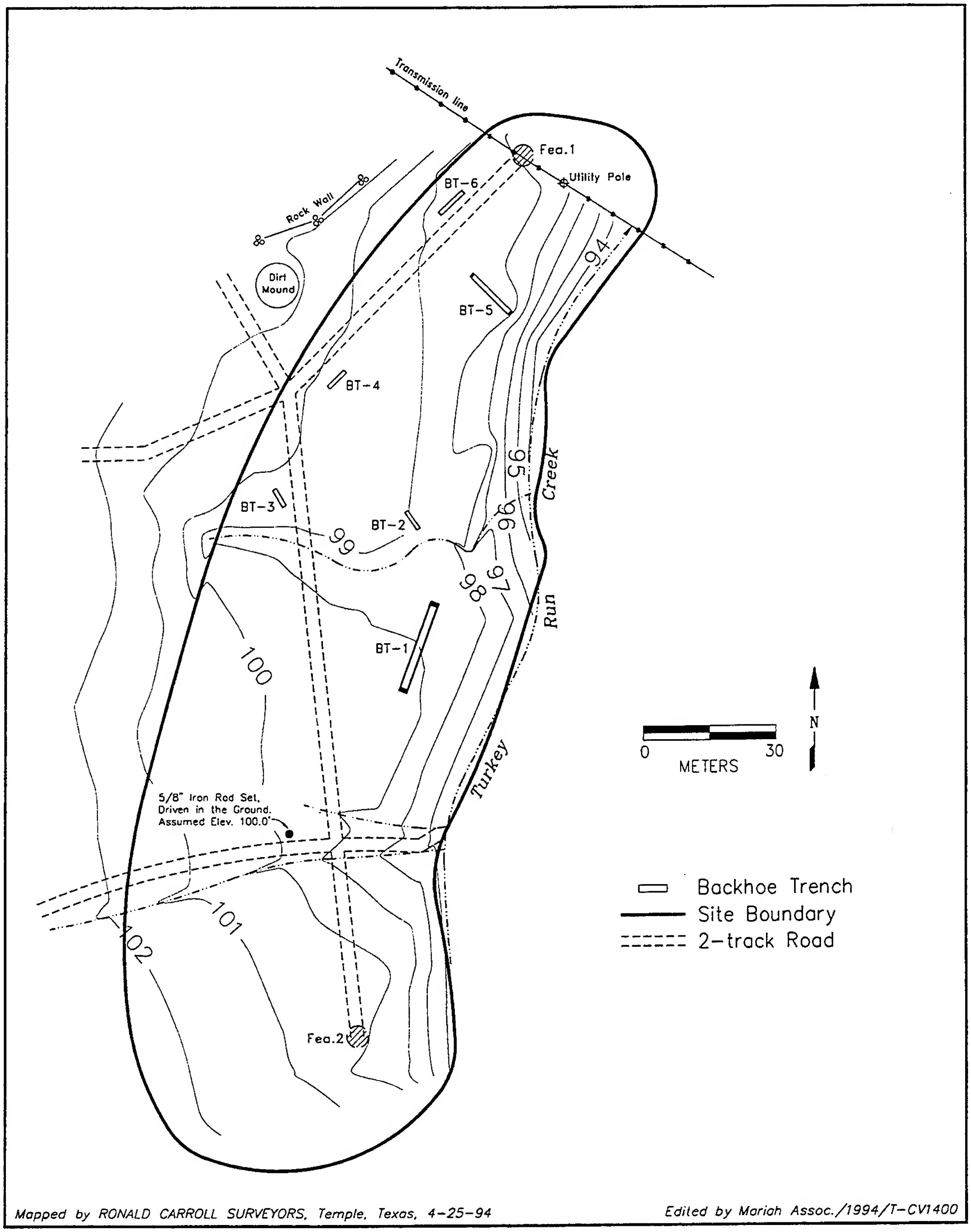

Figure 6.146 Site Map of 41CV1400.

On the upslope end of the trench, these channel gravels graded laterally into fine-grained deposits exhibiting an A-Bk profile. Zone 1 was 10 cm thick and consisted of black (10YR 2/1) granular clay loam containing a few dispersed gravels. Zone 2 was 65 cm thick and composed of massive, very dark grayish brown (10YR 3/2) gravelly clay loam. It is interpreted as a cumulic A horizon formed principally in alluvium, although some colluvial input is probable. Zone 3 extended to the base of the trench at 125 cm. It consisted of massive, dark grayish brown (10YR 4/2), sandy clay loam. A few soft carbonate masses were noted, and cultural material was absent. Similar fine-grained sediments were revealed in BT 6. This fill appears to be a swale fill at the contact between the terrace and the backing slope. A sparse amount of burned rock in probable secondary context was observed in the upper 25 cm of BT 6.

Trench 4 was excavated to a depth of 120 cm, and revealed an Ap-A2-B1w-B2w-BC profile. Zone 1 was 15 cm thick and consisted of dark grayish brown (7.5YR 3/1), platy sandy clay loam. Zone 2 was 25 cm thick and consisted of dark brown (7.5YR 3/2) massive sandy clay loam. Zones 3 and 4 were 35 cm and 30 cm thick, respectively, and consisted of massive brown (7.5YR 4/2), sandy clay loam that graded down into massive brown (7.5YR 4/2), gravelly clay. Zone 5 consisted of mixed clast-supported and matrix-supported gravels in a similar fine matrix. No cultural material was observed. Trench 3 and the upslope portion of BT 5 were very similar, but appeared to have been truncated up to 40 to 50 cm, possibly as a result of erosion stimulated by cultivation. A clear lateral contact between this fill and the younger fill exposed in BT 1 and BT 2 was visible in the wall of BT 5.

No cultural material was detected in primary context while the trenches were being excavated, and no evidence of occupations was found in any of the trench walls after careful inspection.

Table 6.196 List of Treatment Units, 41CV1400.

AU	Treatment Units	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	22	0.8	150
1	BT 2	4	0.8	90
1	BT 3	4	0.8	150
1	BT 4	12	0.8	120
1	BT 5	12	0.8	150
1	BT 6	6	0.8	100

6.26.3 Conclusions and Recommendations

Two distinct, relatively thin alluvial fills were identified on site. The more recent of these fills underlay the T_{1B} surface and was exposed in BTs 1, 2, and the downslope portion of BT 5. In addition, temporally related sediments in a relatively shallow swale deposit at the contact between the bedrock slope on the northern end of the site and the T_{1A} surface were identified in BT 6. This fill appears to correlate with the West Range fill of Nordt (1992). The remainder of the trenches penetrated an older, brown fill that appears to represent the Fort Hood alluvium.

With the exception of some reworked burned rock exposed in BT 6, no buried cultural material was detected in any of the trenches. As a result, the site has very poor potential to address issues outlined in the research design for Fort Hood (Ellis et al. 1994).

On the basis of the foregoing, site 41CV1400 is judged to be not significant and ineligible for inclusion in the NRHP. No further management is recommended for this site.

6.27 SITE 41CV1423

6.27.1 Introduction

In late July 1993, Mariah conducted test excavations at site 41CV1423. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

6.27.1.1 Location and Description

41CV1423 is situated on a high Pleistocene strath terrace of Table Rock Creek. The terrace sediments rest upon a cut limestone strath, and are separated from the channel by a 15 m vertical limestone cliff (Figure 6.147). A minor, east-to-west-oriented tributary and several tank trails bisect the site (Figure 6.148). The area of the site is approximately 175 x 390 m (about 68,000 m^2, or 17 acres). For purposes of this report, the site is considered to be a member of the Table Rock site group.

6.27.1.2 Previous Work

Rotunno and Strychalski originally recorded the site on 28 March 1987. The site contained heavy burned rock scatters and light lithic (bifaces and flakes) scatters exposed across a terrace. A burned rock mound was noted on the site form and map, but no description was given for this feature. Pedernales, Castroville, and Ensor projectile points were recovered from the surface. Hulldowns, vehicular traffic, erosion, and animals were judged to have impacted 66% of the site, and depth of deposit was assessed at less than 50 cm.

On 17 January 1992, Lintz, Oglesby, and Abbott revisited and reevaluated the site based on archeological and geomorphological observations. Two geomorphic subareas were defined. Subarea A, in the southern half of the site, consisted of 50 to 60 cm of Holocene-age slopewash and possible alluvial deposits overlying older fluvial gravels. Flakes, burned rock, and three features (all partially deflated hearths, designated Fs 6, 7, and 8) were noted. Subarea A was considered to have

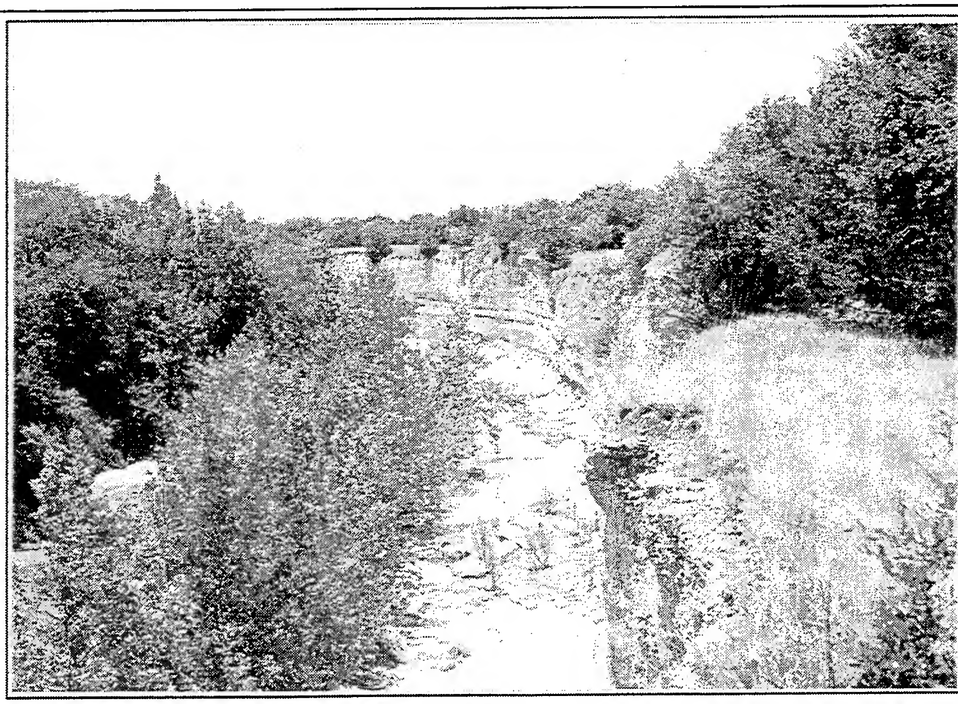

Figure 6.147 Overview of Site 41CV1423, Looking Northwest.

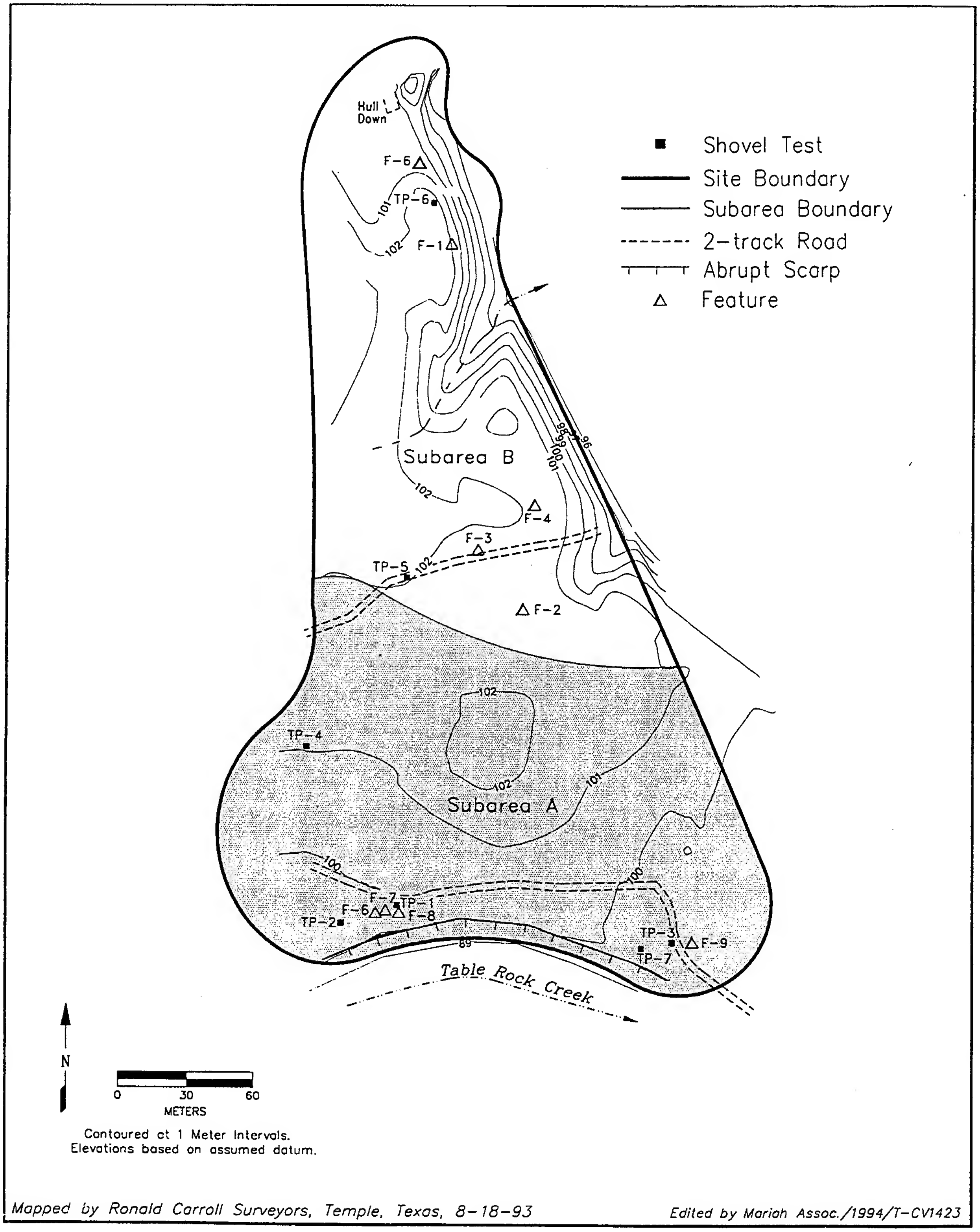

Figure 6.148 Site Map of 41CV1423.

the potential for buried cultural occupations, and was recommended for shovel testing. A crew returned 15 March 1992 and dug 36 shovel tests. Thirty-one tests (86%) contained cultural material (mostly lithics or burned rocks), with most artifacts recovered from 0 to 30 cmbs. Close review of the field notes suggests that many of the "burned" rocks may actually be natural gravels misidentified by the field crew. Largely because of the presence of the hearth features, the eligibility of subarea A for inclusion in the NRHP was uncertain and a minimum testing effort of four to six 1 x 1 m of manually excavated test pits was recommended to determine eligibility (Trierweiler 1994:A1541-A1543). No trenches were recommended since culturally relevant deposits were less than 60 cm thick.

Subarea B, the northern portion of the site, had exposed Pleistocene gravels covering the majority of the surface. Five burned rock features (including a burned rock mound F 1), and four burned rock concentrations (Fs 2 through 5) and a light lithic scatter were noted. Because of the lack of sediment cover, the mound was the only portion of Subarea B recommended for shovel testing. The mound was extremely deflated and measured approximately 14 m in diameter x 30 cm high. One test, excavated from 0 to 30 cmbs in the mound, yielded about 600 burned rocks and 1 flake per level. Feature 1 demonstrated some archeological potential and was assessed as potentially eligible for inclusion in the NRHP. Recommendations for formal testing included a 1 x 2 m^2 test pit adjacent to a mechanically excavated trench (Trierweiler 1994:A1541-A1543).

6.27.1.3 New Work

Six 1 x 1 m test pits (TPs 1 through 5 and 7) were excavated in Subarea A, and one 1 x 1 m test pit (TP 6) was placed in F 1 in Subarea B (Table 6.197). Units in Subarea A were placed near exposed features or in "hot spots" based on shovel testing results. No backhoe trenches were excavated at the site. Recovered cultural materials are summarized in Table 6.198.

Table 6.197 List of Treatment Units, 41CV1423.

AU	Treatment Units	Length (m)	Width (m)	Depth (cmbs)
1	TP 1	1.0	1.0	50
1	TP 2	1.0	1.0	46
1	TP 3	1.0	1.0	60
1	TP 4	1.0	1.0	26
1	TP 5	1.0	1.0	29
1	TP 7	1.0	1.0	26
2	TP 6	1.0	1.0	60

6.27.2 Results

In order to facilitate analysis, two analytical units were defined on the site. Analytical unit 1 consisted of the six units excavated in the Holocene alluvium of Subarea A, while AU 2 consisted of the single unit excavated on the burned rock mound in Subarea B. The results from these two analytical units are addressed separately below.

6.27.2.1 Excavation in the Holocene Alluvium

Test pit 1, excavated to 50 cmbs, was placed at the southwestern portion of Subarea A near the northern edge of Fs 7 and 8, and 1 to 2 m south of an east-to-west-oriented tank trail. These features, along with F 6, were recorded previously as partially deflated hearths measuring 1.5 m in diameter. At present, these three "features" are difficult to distinguish as separate phenomena because a light scatter of burned rock lies between the relatively dense concentrations of rock that were originally defined as features. Further erosion has either exposed more burned rocks along this gully edge or has significantly displaced the previously noted "hearths" so that they now appear to comprise one continuous feature. In TP 1, a total of 54 flakes (half of which came from Level 3) and a few burned rocks were recovered from each level from 20 to 50 cmbs. In Levels 4

Table 6.198 Artifact Recovery by Test Pit, 41CV1423.

	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4					TEST PIT 5					TEST PIT 6					TEST PIT 7				
LEVEL	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
surface	0	0	12	0	0(0)	0	0	5	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	25	0	0(0)	0	0	31	2	149(23)	0	0	2	0	0(0)
1	0	0	6	0	0(0)	0	0	4	0	10(0.3)	0	0	0	0	4(1.5)	0	0	3	0	0(0)	0	0	16	0	0(0)	0	0	0	0	6(0.4)	0	0	3	0	3(0.1)
2	0	0	27	0	0(0)	0	0	0	0	13(1.5)	0	25	0	1	3(0.9)	0	0	0	0	1(1)	0	0	2	0	1(0.4)	0	0	3	0	5(0.4)	0	0	3	0	0(0)
3	0	0	5	0	5(0.5)	0	0	1	0	0(0)	0	0	1	0	12(1.5)	0	0	0	0	3(0.3)	0	0	0	0	0(0)	0	0	2	0	0(0)	0	0	3	0	1(0.1)
4	0	0	1	0	6(0.5)	0	0	0	0	0(0)	0	0	3	1	20(2)	0	0	0	0	0(0)											0	0	11	0	0(0)
5	0	0	0	0	2(0.4)	0	0	0	0	0(0)	0	0	0	0	97(14.5)																0	0	12	1	6(0.3)
6											0	0	0	0	33(3.5)																0	0	0	0	27(7)
TOTAL	0	0	51	0	13(1.4)	0	0	10	0	23(1.8)	0	25	4	2	169(23.9)	0	0	3	0	4(1.3)	0	0	43	0	1(0.4)	0	0	36	2	160(23.8)	0	0	34	1	37(7.5)

and 5, the burned rocks (0.5 kg) were scattered across the unit and usually were less than 5 cm in size. This burned rock may be part of Fs 6, 7, and 8, although the absence of burned rock between 0 to 20 cmbs and the presence of a lithic-artifact peak at 20 to 30 cmbs implies the possible presence of a stratigraphically discrete occupation. In either event, the subsurface rocks do not appear to comprise an intact subsurface feature. Excavation was halted at 50 cmbs due to the presence of large calcium carbonate nodules at the base of the unit, which presumably indicates a pre-Holocene age. This corresponds to the schematic profile of a Bw horizon overlying an erosional surface (2Bk horizon) noted during geomorphic assessment in previous visits to the site. The cultural material in TP 1 is embedded in the alluvium/slopewash, and does not appear to rest directly on the pre-Holocene erosional surface.

Test pit 2 (Figure 6.149) was located near the terrace edge, approximately 25 m southwest of TP 1. A few flakes and several burned rocks were recovered in the upper 20 cm, and a single flake was recovered from Level 4. No other artifacts were recovered. Decaying limestone (or possibly a petrocalcic horizon) was encountered at 44 to 46 cmbs in TP 2. Caliche nodules and/or gravels were present in every level. This was particularly true at 17 cmbs, where a gravel and caliche lens of probable colluvial origin covered the eastern third of the unit. The test pit was terminated at 50 cmbs. A previous shovel test in this area indicated a high burned rock count (150 pieces) from 0 to 40 cmbs. Although reservations had been expressed previously about the reliability of distinction between burned and unburned rock, the relatively small number of burned rocks in TP 2 is still remarkable given previous yields in the area.

During testing, a previously unrecorded burned rock concentration (designated F 9) was observed in an exposure along the western edge of a tank trail at the southeastern corner of Subarea A. It rested on a fairly flat surface and was amorphous in shape. Test pit 3 (see Figure 6.149) was placed adjacent to F 9. Within TP 3, a few burned rocks were found in the upper 20 cm. Feature 9 was encountered 20 to 55 cmbs. Artifact frequency was relatively low in the upper portion of the feature, but increased to a peak at the base of the feature. A total of 162 burned rocks (21.5), generally greater than 5 cm in diameter, were recovered from F9 in TP 3. No cultural material was found from 55 to 60 cmbs and excavation was terminated.

Test pit 7 was placed near the southern edge of the terrace, approximately 10 m west of TP 3. This location was chosen to determine the western extent of F 9. In TP 7, a low frequency of

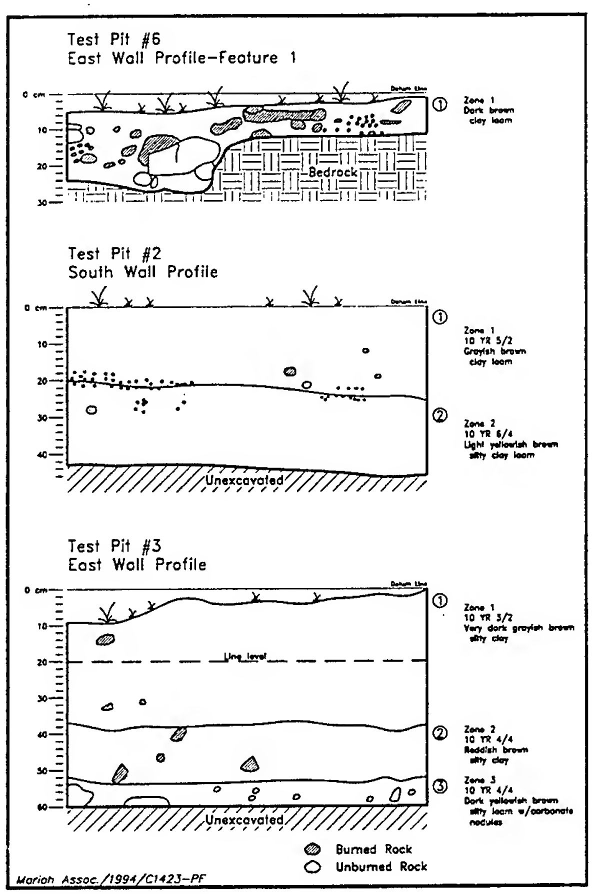

Figure 6.149 Profiles of East Wall, TP 6 (Showing F 1 in Section), South Wall, TP 2, and East Wall, TP 3, 41CV1423.

artifacts was found in the upper 50 cm. A distinct soil change from a brown (10YR 5/3) A horizon to reddish brown (5YR 5/3) Bw horizon occurred near the top of Level 4. An apparent increase in artifacts occurred beginning with Level 5. Feature 9 was encountered as a somewhat dispersed but discrete lens of burned rock at 50 to 57 cmbs. Recovery from this pit was substantially less than that within TP 3. A total of 27 burned rocks (7 kg) were recovered from the lower level of TP 7, from 50 to 57 cmbs. Several unburned pieces of limestone were mixed with these burned rocks and rodent burrowing was observed within the feature. A few flakes and a couple of rodent bones were recovered from the feature. The base of the feature appears to rest on the Bw/erosional surface contact. A single flake was found from 57 to 60 cmbs, with gravels and nodules encountered at 60 cmbs, where excavation was halted.

Test pit 4, excavated to 26 cmbs, was located along the west-central edge of Subarea A, in an area where a moderate density of burned rock was found during shovel testing at 10 to 30 cmbs. Only a few burned rocks and flakes were recovered from 0 to 26 cmbs in TP 4. At 17 cmbs, the soil changed from a grayish brown (10YR 5/2) A horizon to a very compact, reddish brown clay (10YR 5/3) loam Bt horizon. As with TP 2, the low frequency of burned rock contrasts remarkably with previous results from nearby shovel tests. The cultural material in TP 4 is highly likely to have been deposited along with active natural deposition, although the pace of natural deposition could have been relatively slow.

Test pit 5 was located on the southern edge of the northernmost E-W oriented trail within Subarea A. Burned rocks and lithics were visible in the road and, once again, a previous shovel test in this area had indicated a high frequency of burned rock from 0 to 40 cmbs. In TP 5, numerous flakes and a burned rock were found from surface to 20 cmbs, with no recovery in Level 3. Bedrock and gravels were encountered 21 to 29 cmbs, at which point excavations were halted. As with other units, burned rock yields were much lower than expected from shovel test results. The cultural material in TP 5 is located in a transitional zone between the erosional Pleistocene surface in Subarea B and the colluvial unit in Subarea A. This material is not likely to have a useful depositional context because these materials appear to be resting directly on the Pleistocene Bkm surface.

Two middle stage bifaces of Heiner Lake Tan and a uniface of indeterminate light brown chert were recovered from this terrace. No other nondebitage lithic specimens were recovered. The debitage assemblage was also relatively modest, but included four identified chert types and eight indeterminate chert categories (Table 6.199). Twenty percent of the assemblage was identified. When the entire assemblage was considered, the

Table 6.199 Debitage Recovery by Size and Material Type, AU 1, 41CV1423.

	Size (cm)					
Lithic Material	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types						
06-HL Tan	0	6	8	7	1	22
07-Foss Pale Brown	0	0	0	1	0	1
08-FH Yellow	0	3	1	1	0	5
17-Owl Crk Black	0	0	1	0	0	1
Subtotal	*0*	*9*	*10*	*9*	*1*	*29*
Unidentified Types						
Indet Black	2	0	0	0	0	2
Indet Dk Brown	4	14	3	0	0	21
Indet Dk Gray	1	2	0	0	0	3
Indet Lt Brown	31	15	14	2	0	62
Indet Lt Gray	1	8	3	1	0	13
Indet Misc.	0	1	1	1	0	3
Indet Mottled	0	0	1	2	1	4
Indet White	2	0	5	1	0	8
Subtotal	*41*	*40*	*27*	*7*	*1*	*116*
Total	**41**	**49**	**37**	**16**	**2**	**145**

aggregate indeterminates occurred in greater than expected frequency, Heiner Lake Tan occurred in expected frequency, and the remainder of identified types occurred in less than expected frequencies. When the indeterminates were excluded, Heiner Lake Tan occurred in greater than expected frequency, Fort Hood Yellow occurred in expected frequency, and Fossiliferous Pale Brown and Owl Creek Black occurred in less than expected frequencies (Table 6.200).

Represented chert provinces consist of the Southeast Range (79% of the identified total) and North Fort (21%). Eighty-eight percent of the flakes are smaller than 1.8 cm, and 93% are decortified, suggesting that latter-stage reduction predominated (Table 6.199). Although the Table Rock channel is notoriously chert-poor, roughly 44% of the cortical flakes are stream abraded, suggesting that much of the initial reduction on site was performed on stream-procured cobbles (Table 6.201).

6.27.2.2 Excavation in the Burned Rock Mound

Test pit 6 (see Figure 6.148) was the only unit excavated in Subarea B, a Pleistocene-age surface. The test pit was placed on F 1, a deflated burned rock mound. The vast majority of artifacts were recovered in the upper 10 cm, with a high frequency of burned rocks and several flakes found therein. At 10 cmbs, bedrock covered the entire unit except for the northeast quad (50 x 50 cm area). A few burned rocks and flakes were recovered within this area from 10 to 26 cmbs. Within TP 6, 160 burned rocks (24 kg) were recovered from the feature. These burned rocks were mixed with approximately the same amount of unburned rocks. Interestingly, the feature was situated above a natural depression in bedrock. Excavation bottomed out on bedrock at ending depths ranging from 20 to 26 cmbs. Based on the admixture of natural and burned rocks, the shallow depth of deposit, and overall similar appearance of the feature across the surface, F 1 comprises a thin, deflated cultural veneer overlying the Pleistocene terrace in Subarea B.

One utilized flake of Fort Hood Yellow and a wedge of indeterminate light brown chert are the only tools recovered from F 1, the burned rock midden. A small debitage assemblage, consisting of two identified types and six indeterminate chert categories, was recovered from the mound (Table 6.202). Roughly 22% of the assemblage was identified. When the entire assemblage was considered, the aggregate indeterminates occurred in greater than expected frequency and the two identified types occurred in less than expected frequency, while both known types occurred in the expected range when the indeterminates were excluded (Table 6.203). Although a wide range of sizes was present in the relatively small sample, the majority (87%) were less than 1.8 cm in size (Table 6.202). Of the seven cortical flakes, six (86%) were clearly stream abraded, suggesting that

Table 6.200 Binomial Statistic Results, AU 1, 41CV1423.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
06-HL Tan	22	20	38	expected	3	12	more
07-Foss Pale Brown	1	20	38	less	3	12	less
08-FH Yellow	5	20	38	less	3	12	expected
17-Owl Crk Black	1	20	38	less	3	12	less
Total Indet	116	20	38	more	na	na	na

secondary alluvial deposits were an important source for raw material reduced on site (Table 6.204).

6.27.3 Conclusions and Recommendations

Deposition units in Subarea A consist of approximately 0.5 m of probable Holocene alluvium or mixed alluvium and sheetwash overlain by a patchy veneer of sheetwash up to 10 cm in thickness. This alluvium could conceivably represent a single, high-magnitude depositional event, but more likely signifies intermittent deposition by floods throughout much of the Holocene, and in particular, the early-middle Holocene (Fort Hood alluvium of Nordt 1992). The alluvium lies unconformably on top of a Pleistocene-age alluvium equivalent to Nordt's (1992) Jackson or Reserve alluvium. The underlying fill is gravelly and locally indurated, exhibiting a variable petrocalcic or calcic horizon.

Frequencies of burned rock from units in Subarea A show that the very high densities of burned rock noted during shovel testing were overestimated, probably as a result of misidentification. Results of testing, however, also demonstrate that activities involving burned rock were widespread at this site. Although most cultural materials in Subarea A are shallowly buried (generally less than 60 cm), the areas around TPs 1 through 4 and TP 7 have high potential to yield cultural materials in buried, stratified (albeit highly compressed) context. These areas contain stratified cultural deposits suited for technological and geoarcheological studies specified in the research design for Fort Hood (Ellis et al. 1994). It is necessary to note that the depositional context for these materials may reflect relatively slow burial. If the alluvium at the site is in fact equivalent to Nordt's Fort Hood alluvium, then the cultural materials probably date to the Early Archaic or initial Middle Archaic. These periods are very poorly known at Fort Hood and in Central Texas as a whole (Ellis 1994a). Hence, even if these cultural materials are in a slowly aggrading depositional context, they represent occupations that can be

Table 6.201 Debitage Cortex Characteristics by Material Type, AU 1, 41CV1423.

	Partial Cortex					
Lithic Material	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	Total
Identified Types						
06-HL Tan	1	1	0	20	0	22
07-Foss Pale Brown	1	0	0	0	0	1
08-FH Yellow	0	0	0	5	0	5
17-Owl Crk Black	0	0	0	1	0	1
Subtotal	*2*	*1*	*0*	*26*	*0*	*29*
Unidentified Types						
Indet Black	0	0	0	2	0	2
Indet Dk Brown	0	1	0	20	0	21
Indet Dk Gray	0	0	1	2	0	3
Indet Lt Brown	1	1	0	60	0	62
Indet Lt Gray	0	0	0	13	0	13
Indet Misc.	0	0	0	2	1	3
Indet Mottled	1	1	0	2	0	4
Indet White	0	0	0	8	0	8
Subtotal	*2*	*3*	*1*	*109*	*1*	*116*
Total	**4**	**4**	**1**	**135**	**1**	**145**

Table 6.202 Debitage Recovery by Size and Material Type, AU 2, 41CV1423.

	Size (cm)					
Lithic Material	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	Total
Identified Types						
06-HL Tan	0	3	2	0	0	5
17-Owl Crk Black	0	0	2	1	0	3
Subtotal	*0*	*3*	*4*	*1*	*0*	*8*
Unidentified Types						
Indet Black	3	0	0	0	0	3
Indet Dk Brown	3	0	0	2	0	5
Indet Dk Gray	0	2	0	0	0	2
Indet Lt Brown	2	1	7	0	0	10
Indet Lt Gray	0	6	0	0	1	7
Indet Mottled	0	0	0	0	1	1
Subtotal	*8*	*9*	*7*	*2*	*2*	*28*
Total	**8**	**12**	**11**	**3**	**2**	**36**

Table 6.203 Binomial Statistic Results, AU 2, 41CV1423.

		Including Indeterminates			Excluding Indeterminates		
Lithic Material	N	Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
06-HL Tan	5	6	17	less	1	7	expected
17-Owl Crk Black	3	6	17	less	1	7	expected
Total Indet	28	6	17	more	na	na	na

isolated to a specific, poorly understood portion of the general Central Texas sequence. As such, they currently have high value as a source of data that will be very useful for understanding the nature of more discrete Early Archaic to initial Middle Archaic assemblages. This is especially true for the Fort Hood area because discrete, stratified Early Archaic components are relatively rare. However, as data from discrete Early Archaic occupations accumulates, the value of the cultural materials at this site will decrease.

Cultural materials in the vicinity of TP 5, at the northern edge of Subarea A, are not in a depositional context well suited for technological or other artifact analyses. However, the sedimentary environment in this vicinity has substantial geoarcheological potential with respect to landscape reconstruction and paleoclimatic reconstructions that can be based on geomorphic evidence (Ellis et al. 1994). Thus, the northern portion of Subarea A has the potential to contribute important geoarcheological data that complements the cultural and other data available in the southern portion of Subarea A.

Feature 1 is a surficial deposit that comprises a localized veneer of cultural material in Subarea B. Although it may have been a well-structured burned rock feature at some point, it now appears to be largely deflated with virtually no potential to yield data that would be useful within constraints of the research design. Along with the rest of Subarea B, F 1, therefore, can be regarded as having low research potential.

On the basis of the foregoing, Subarea B is judged to be insignificant and ineligible for inclusion in the NRHP. No further work is recommended for Subarea B. However, the cultural material in Subarea A has the capacity to provide important archeological and geoarcheological data sets relevant to the poorly understood Early Archaic

Table 6.204 Debitage Cortex Characteristics by Material Type, AU 2, 41CV1423.

	Partial Cortex			
Lithic Material	Abraded	Unabraded	No Cortex	Total
Identified Types				
06-HL Tan	0	0	5	5
17-Owl Crk Black	1	0	2	3
Subtotal	*1*	*0*	*7*	*8*
Unidentified Types				
Indet Black	0	0	3	3
Indet Dk Brown	2	0	3	5
Indet Dk Gray	0	0	2	2
Indet Lt Brown	2	0	8	10
Indet Lt Gray	1	0	6	7
Indet Mottled	0	1	0	1
Subtotal	*5*	*1*	*22*	*28*
Total	**6**	**1**	**29**	**36**

period. Subarea A is judged to be significant and eligible for inclusion in the NRHP by virtue of its capacity to yield data that has the capacity to address currently significant research issues. Accordingly, this portion of the site should be preserved and protected from adverse impacts. Because the known eligible components are shallowly buried, protection measures should include efforts to prevent damage by tracked and wheeled vehicles. Protection efforts also should include measures to prevent subsurface disturbance by vandalism and excavation performed in conjunction with training exercises.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1993. The current state of studies of the Early Archaic period should be especially carefully evaluated prior to any mitigation efforts because future developments in this topic area may drastically alter the value of the assemblage at 41CV1423.

Mitigative data recovery may include up to 80 m^2 of manually excavated blocks and backhoe trenches to expose relevant geoarcheological exposures. Block excavations should be concentrated largely in the area around F 9. Given an average depth of 55 cm, block excavations may total about 45 m^2. Trenches should be placed near F 9 to facilitate accurate placement of blocks. Additional trenches should be placed in other locales within Subarea A for prospection and to provide geoarcheological exposures, especially exposures that have the potential to reveal correlations between stratigraphic units. These trenches should be carefully monitored to avoid damage to currently unknown deposits that may be present. If intact deposits are discovered during trench excavation, they may add an unknown volume of manual block excavations to the estimate above.

7.0 SUMMARY AND MANAGEMENT RECOMMENDATIONS

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7.1 TESTING PHASE SUMMARY

The objective of the current testing program has been to evaluate each prehistoric site with regards to eligibility for inclusion to the NRHP. Each of the sites had been previously shovel tested and had been determined to have potentially intact cultural deposits of unknown significance. By definition, the shovel tests of the earlier work had been limited in both size (30 to 40 cm diameter), depth (40 to 80 cm), and frequency (one per 900 m^2) and hence could not clearly define cultural features nor investigate the possibility of deeply buried deposits. Accordingly, these tactics did not permit a clear assessment of eligibility for many sites, rendering further testing necessary.

Whereas the shovel testing phase allowed for an assessment of "unknown eligibility," this phase of work was been explicitly intended to remove all doubt about each site and to clearly demonstrate, one way or another, site significance and NRHP eligibility. A secondary goal was to obtain sufficient information about NRHP eligible sites to allow preliminary planning for data recovery (should such become necessary). The fundamental information needed to plan for data recovery include *what* kinds of deposits and cultural remains are present, *where* these are located (vertically and horizontally), to *when* the deposits date, and *how* they may have been transformed.

7.1.1 Level of Effort

Two major field tactics were employed during the current work to collect the information necessary with which to assess site eligibility and to plan data recovery. As has been discussed in some detail in Chapter 4.0, backhoe/gradall trenches were employed to prospect quickly for deeply buried deposits and also to assess the depth and horizontal extent of cultural deposits. Controlled manual excavations were employed to recover a quantified sample of representative artifacts and specimens and to obtain detailed information about cultural features noted in profile in the trenches. A third tactic, employed to a limited extent at two rockshelters, used rock saws to recover samples of indurated tufa.

The 57 prehistoric sites were tested using 212 manually excavated test pits and 186 backhoe trenches. As indicated in Table 7.1, 32 sites (56%) received both test pits and backhoe trenches, 19 sites (32%) received test pits only (most of these are rockshelters), five sites (9%) received trenches only, and one site received neither trenches nor test pits (41BL432, a rockshelter at which tufa samples were recovered).

Of the 51 sites with manually excavated test pits, a mean of 4.2 test pits was excavated per site to a maximum of 13 test pits on site 41CV97. The manual excavations on these sites totaled 253.6 m^3 and ranged from a minimum of 0.5 m^3 on 41BL743 to a maximum of 28.3 m^3 on site 41CV97. The 212 test pits individually ranged from a minimum of 20 cm deep in five rockshelters to a maximum of 620 cm below the modern surface on 41CV1105 (although this unit started on a backhoe bench at 380 cmbs). Average

Table 7.1 Frequency of Sites by Numbers of Test Pits and Backhoe Trenches.

	Backhoe Trenches				
Test Pits	0	1-2	3-4	5+	Total
0	1*	1	1	3	6
1-2	4	5	2	1	12
3-4	10	4	4	5	23
5-6	3	0	0	5	8
7+	2	2	1	3	8
Total	20	12	8	17	57

* Recovered tufa sample.

depth was 120 cm; 27 units (13%) were shallower than 50 cm, and 67 units (32%) were deeper than 200 cm. The deepest continuous column was TP 1 on 41CV1105, which was offset from a steeply exposed cutbank and was dug from the modern ground surface to 500 cmbs.

The 37 trenched sites received a mean of 5.0 trenches per site with a maximum of 23 trenches on site 41BL208. Five sites (41BL421, 41BL853, 41CV1097, 41CV1099, and 41CV1400) were investigated with trenches only (two to six per site). Because no cultural material was detected in any of the trenches, no further manual excavations were pursued. With one exception, this level of testing effort was in accordance with (or exceeded) the management recommendations that had been accepted previously by Fort Hood and by the SHPO; on site 41BL853, while the earlier recommendation called for one trench and two test pits (Trierweiler 1994:A573), four trenches were dug but none revealed any cultural material so no manual excavation was done. The sixth, which received no manual excavations, was a rockshelter (41BL432) tested by recovery of a tufa sample.

7.1.2 Sample and Artifact Recovery

Testing fieldwork recovered a total of 78,893 artifacts and samples from the 57 sites, including 66,543 prehistoric and 75 historic artifacts from the 1/4-inch mesh screens, 3,330 samples, and 8,945 fine-screened artifacts recovered from the flotation heavy fractions (Table 7.2). As described in detail above (see Chapter 4.0), artifacts from the flotation sample heavy-fractions were sieved prior to analysis; those larger than 1/4-inch were included in the full artifact analysis while the microdebitage was tabulated and further analyzed. The items recovered from the flotation heavy fraction were overwhelmingly lithic microdebitage (94.6%) but also included 168 macrobotanical specimens, 241 bone microdebitage, and 76 bivalve shell debitage. Most of the samples (69%) were landsnails that had been hand picked from the field screens and from the flotation heavy fractions, but an additional 314 charcoal samples and 634 flotation samples were collected, largely from feature contexts. In addition, 87 other types of samples were collected, including burned earth, tufa, and ochre.

Net artifact recovery from the 1/4-inch screens ranged from zero artifacts on seven sites (41BL421, 41BL427, 41BL432, 41BL454, 41CV1097, 41CV1099, and 41CV1400) to more than 15,000 artifacts on site 41BL821. Of the 50 sites that yielded artifacts, average recovery was 1,331 artifacts per site, and only seven sites had fewer than 100 artifacts. By far, the most frequent artifact class was lithic debitage, comprising 82% of the total assemblage. This was followed distantly by bone debitage (11%), bivalve umbos (5%), and lithic tools (2%). The remaining artifact classes together comprised less than 1% of the total. Of note were 55 ceramics recovered from three sites (41CV174, 41CV960, and 41CV1038) and 277 projectile points recovered from 37 sites. Of the 43 sites with an adequate sample size (i.e. 100 or more) of recovered artifacts, the proportion of lithic debitage to the total prehistoric assemblage varied widely from 100% on 41BL743 (n=317) to 21% on 41BL339 (n=1,448). In general, those sites characterized by less than 90% debitage had unusually large numbers of bone and/or shell (Table 7.2).

Of the 2,536 excavated levels on all 57 sites, 1,470 levels yielded artifacts or samples for an overall ubiquity measure of 58%. However, ubiquity varied widely between sites with no clear central tendency. Three sites (41BL743, 41BL168, and 41CV1008) produced artifacts from every excavated level (100% ubiquity) while two others (41CV164 and 41CV1098) had less than 15% ubiquity (Table 7.3). Controlling for excavated volume, overall artifact density (for the 49 sites having some artifacts) was 262 specimens per cubic meter (see Table 7.3), ranging from a maximum density of 3,516 artifacts/m^3 on site 41BL821 (4.4 m^3) to minimum of only 1.2 artifacts/m^3 on site 41CV1098 (6.6 m^3). Net artifact density, or the frequency of artifacts per positive level, was 453 items per cubic meter with

Table 7.2 Sample and Artifact Recovery from 57 Sites.

	ARTIFACTS (1/4" screen)												SAMPLES										
	PREHISTORIC																	Flotation Heavy Fraction (d)					
SITE	Lithic Debitage	Lithic Core	Lithic Point	Lithic Tool	Ground / Pecked	Hammer/Abrader	Bone Tool	Bone Debitage	Ceramic	Bivalve Umbo	Prehistoric Subtotal	Historic (a)	Charcoal	Land Snails (b)	Other (c)	Flotation	Sample Subtotal	Macrobotanical	Lithic Microdebitage	Bone Microdebitage	Bivalve Debitage	Fine Screen Subtotal	GRAND TOTAL
41BL154	3,836	4	14	125	1	1	2	164	-	-	4,147	-	9	23	1	22	55	5	222	6	-	233	4,435
41BL168	1,687	-	4	8	-	-	-	20	-	12	1,731	3	1	34	-	23	58	7	2,195	4	8	2,214	4,006
41BL198	90	-	2	5	-	-	-	30	-	3	130	-	2	30	-	18	50	-	18	1	-	19	199
41BL208	68	-	1	51	-	-	-	-	-	-	120	-	-	7	1	-	8	-	-	-	-	0	128
41BL339	301	3	1	19	-	-	-	163	-	961	1,448	-	9	72	-	9	90	5	20	6	3	34	1,572
41BL415	209	-	-	7	-	-	-	-	-	9	225	1	1	15	-	1	17	-	6	-	-	6	249
41BL421	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	0
41BL427	-	-	-	-	-	-	-	-	-	-	0	-	-	6	-	-	6	-	-	-	-	0	6
41BL432	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	0
41BL433	4,566	5	9	64	-	-	-	229	-	91	4,964	-	4	41	-	12	57	20	170	3	3	196	5,217
41BL454	-	-	-	-	-	-	-	-	-	-	0	-	-	28	-	-	28	-	-	-	-	0	28
41BL470	108	-	1	3	-	-	-	-	-	81	193	-	-	60	-	-	60	-	-	-	-	0	253
41BL513	87	-	-	6	-	-	-	-	-	-	93	-	-	32	-	4	36	-	8	-	-	8	137
41BL532	327	2	4	6	-	-	-	-	-	68	407	-	3	80	-	1	84	-	2	-	1	3	494
41BL538	4	-	-	1	-	-	-	23	-	-	28	-	-	14	-	14	28	2	1	-	-	3	59
41BL564	18	-	-	1	-	-	-	-	-	-	19	-	10	8	-	9	27	5	8	-	-	13	59
41BL567	1,033	-	8	10	-	-	-	72	-	24	1,147	-	11	13	-	16	40	11	69	1	-	81	1,268
41BL568	121	-	2	2	-	-	-	4	-	-	129	-	-	24	-	29	53	1	27	-	-	28	210
41BL740	614	1	2	24	-	1	-	20	-	1	663	1	4	16	2	3	25	2	1,021	2	-	1,025	1,714
41BL743	317	-	-	-	-	-	-	-	-	-	317	-	10	5	-	5	20	5	722	5	7	739	1,076
41BL744	131	1	-	1	-	-	-	80	-	8	221	18	6	23	-	14	43	2	84	7	-	93	375
41BL751	294	-	3	6	-	-	-	-	-	13	316	-	-	24	-	13	37	-	31	-	2	33	386
41BL754	929	1	5	13	-	-	-	95	-	4	1,047	-	10	34	-	19	63	6	60	1	1	68	1,178
41BL755	1,359	1	7	22	-	1	-	56	-	68	1,514	-	20	70	1	3	94	-	349	2	2	353	1,961
41BL765	162	1	-	6	-	-	-	1	-	9	179	-	-	24	-	14	38	6	36	1	-	43	260
41BL821	14,449	8	24	161	1	1	3	782	-	41	15,470	1	10	55	-	24	89	8	1,530	35	12	1,585	17,145
41BL834	654	2	1	46	-	-	-	1	-	-	704	-	-	7	1	-	8	1	-	-	-	1	713
41BL853	-	-	2	-	-	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	0	2
41BL886	346	1	3	5	-	-	1	476	-	1	833	2	1	37	-	70	108	3	45	16	-	64	1,007
41BL888	534	2	3	28	-	-	-	108	-	39	714	-	10	68	-	14	92	2	118	4	-	124	930
41CV95	304	1	3	21	-	3	-	22	-	390	744	-	3	98	29	10	140	9	8	1	2	20	904
41CV97	3,378	12	24	122	-	2	3	1,607	-	613	5,761	1	43	330	5	63	441	19	153	25	7	204	6,407
41CV137	4,356	4	42	75	-	1	3	655	-	2	5,138	-	1	45	-	18	64	2	559	16	-	577	5,779
41CV164	-	-	-	-	-	-	-	57	-	-	57	-	1	9	-	1	11	-	-	2	-	2	70
41CV174	689	-	11	36	1	-	-	654	53	12	1,456	1	29	116	10	28	183	9	23	6	-	38	1,678
41CV319	38	-	-	-	-	-	-	-	-	-	38	5	8	21	1	10	40	-	-	-	-	0	83
41CV587	2,527	2	14	70	-	2	1	242	-	27	2,885	34	8	44	-	10	62	-	157	7	-	164	3,145
41CV595	474	-	7	13	-	-	-	29	-	-	523	-	7	23	-	1	31	-	-	-	-	0	554
41CV960	1,879	1	8	34	-	-	-	107	1	135	2,165	-	11	118	-	7	136	6	17	-	-	23	2,324
41CV1007	2,061	2	14	36	-	-	-	329	-	107	2,549	2	4	60	-	26	90	-	443	77	-	520	3,161
41CV1008	866	-	8	14	-	-	-	277	-	2	1,167	-	-	5	-	4	9	6	4	4	4	18	1,194
41CV1011	2,559	4	16	97	-	2	-	432	-	6	3,116	-	2	16	5	-	23	1	-	-	-	1	3,140
41CV1023	210	-	4	3	1	-	-	-	-	-	218	-	-	7	-	2	9	-	-	-	-	0	227
41CV1027	115	-	5	2	-	-	-	-	-	10	132	-	11	37	-	15	63	7	17	-	16	40	235
41CV1038	142	1	4	12	-	-	-	233	1	42	435	-	11	44	1	7	63	2	-	4	-	6	504
41CV1085	482	-	4	17	-	-	-	2	-	1	506	1	1	28	-	32	61	3	74	-	-	77	645
41CV1097	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	0
41CV1098	5	-	-	1	-	-	-	-	-	2	8	-	5	46	-	3	54	-	-	-	-	0	62
41CV1099	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	0
41CV1105	402	1	4	5	-	-	-	5	-	467	884	-	5	115	7	15	142	4	12	-	5	21	1,047
41CV1116	144	-	-	1	-	-	-	1	-	-	146	-	-	30	-	-	30	-	-	-	-	0	176
41CV1136	196	-	3	12	1	-	-	20	-	4	236	-	12	145	4	12	173	6	174	1	2	183	592
41CV1167	675	1	8	31	-	-	1	226	-	3	945	-	2	16	-	6	24	1	42	2	1	46	1,015
41CV1200	135	-	-	3	-	-	-	54	-	19	211	1	20	43	17	14	94	-	6	2	-	8	314
41CV1391	240	1	2	8	-	-	-	-	-	-	251	4	9	46	2	10	67	2	28	-	-	30	352
41CV1400	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	0
41CV1423	181	-	-	5	-	-	-	25	-	-	211	-	-	3	-	3	6	-	1	-	-	1	218
GRAND TOTAL	54,302	62	277	1,238	5	14	14	7,301	55	3,275	66,543	75	314	2,295	87	634	3,330	168	8,460	241	76	8,945	78,893

Notes:

a. Historic artifacts were not routinely collected.

b. Some of these snails were recovered from flotation heavy fraction.

c. Includes tufa, ochre, burned earth, soil chemistry, and pollen samples.

d. Flotation heavy fractions were dried and sieved; recovered cultural materials were sorted and tabulated.

Table 7.3 Artifact Ubiquity and Artifact Frequency from 57 Sites.

	ARTIFACT UBIQUITY				ARTIFACT FREQUENCY			
SITE	Test Pits	Total levels	Positive levels (a)	NET UBIQUITY	Total Artifacts (b)	Volume Dug (m^3)	GROSS DENSITY (c)	NET DENSITY (d)
41BL154	4	72	66	92%	4,147	7.2	576	628
41BL168	5	20	20	100%	1,731	2.0	866	866
41BL198	3	18	14	78%	130	1.8	72	93
41BL208	4	38	12	32%	120	3.8	32	100
41BL339	5	78	60	77%	1,448	7.8	186	241
41BL415	7	59	36	61%	225	5.9	38	63
41BL421	0	0	0	0%	0	0.0	0	0
41BL427	3	31	0	0%	0	3.1	0	0
41BL432	0	0	0	0%	0	0.0	0	0
41BL433	3	16	13	81%	4,964	1.6	3,103	3,818
41BL454	2	37	0	0%	0	3.7	0	0
41BL470	3	61	34	56%	193	6.1	32	57
41BL513	4	37	15	41%	93	3.7	25	62
41BL532	6	57	35	61%	407	5.7	71	116
41BL538	3	15	6	40%	28	1.5	19	47
41BL564	1	8	6	75%	19	0.8	24	32
41BL567	2	10	6	60%	1,147	1.0	1,147	1,912
41BL568	4	25	24	96%	129	2.5	52	54
41BL740	6	30	26	87%	663	3.0	221	255
41BL743	1	5	5	100%	317	0.5	634	634
41BL744	3	15	13	87%	221	1.5	147	170
41BL751	1	15	13	87%	316	1.5	211	243
41BL754	2	20	13	65%	1,047	2.0	524	805
41BL755	4	64	48	75%	1,514	6.4	237	315
41BL765	3	11	3	27%	179	1.1	163	597
41BL821	4	44	41	93%	15,470	4.4	3,516	3,773
41BL834	3	42	34	81%	704	4.2	168	207
41BL853	0	0	0	0%	2	0.0	0	0
41BL886	7	65	39	60%	833	6.5	128	214
41BL888	4	55	39	71%	714	5.5	130	183
41CV95	6	89	57	64%	744	8.9	84	131
41CV97	13	283	184	65%	5,761	28.3	204	313
41CV137	2	29	22	76%	5,138	2.9	1,772	2,335
41CV164	2	24	3	13%	57	2.4	24	190
41CV174	7	98	64	65%	1,456	9.8	149	228
41CV319	4	22	9	41%	38	2.2	17	42
41CV587	4	61	54	89%	2,885	6.1	473	534
41CV595	4	35	29	83%	523	3.5	149	180
41CV960	6	130	48	37%	2,165	13.0	167	451
41CV1007	4	73	52	71%	2,549	7.3	349	490
41CV1008	2	6	6	100%	1,167	0.6	1,945	1,945
41CV1011	3	27	18	67%	3,116	2.7	1,154	1,731
41CV1023	7	23	7	30%	218	2.3	95	311
41CV1027	8	55	24	44%	132	5.5	24	55
41CV1038	3	43	26	60%	435	4.3	101	167
41CV1085	4	33	23	70%	506	3.3	153	220
41CV1097	0	0	0	0%	0	0.0	0	0
41CV1098	3	66	7	11%	8	6.6	1	11
41CV1099	0	0	0	0%	0	0.0	0	0
41CV1105	6	152	70	46%	884	15.2	58	126
41CV1116	2	30	10	33%	146	3.0	49	146
41CV1136	7	132	59	45%	236	13.2	18	40
41CV1167	2	20	18	90%	945	2.0	473	525
41CV1200	2	48	16	33%	211	4.8	44	132
41CV1391	8	72	21	29%	251	7.2	35	120
41CV1400	0	0	0	0%	0	0.0	0	0
41CV1423	6	37	22	59%	211	3.7	57	96
TOTAL	212	2,536	1,470	58%	66,543	253.6	262	453

NOTES:
(a) non-sterile
(b) from 1/4" screens, excluding historic
(c) Total Artifacts / Volume
(d) Total Artifacts / volume of positive levels

maxima and minima similar to those for overall density (see Table 7.3).

7.2 SITE RESEARCH POTENTIAL AND NRHP ELIGIBILITY

The tactics adopted to assess site significance focused on a selected subset of data needs. These included data needs of the chronology, subsistence, and technologies research domains, supplemented as necessary with the red flag criteria (see Chapter 3.0) and with information on integrity of deposits. Addressing these research domains fully provided the necessary and sufficient information with which to completely assess each site. Consequently, the testing tactics did *not* systematically collect nor analyze observations that had bearing on any of the data needs in the paleoenvironment research domain (although relevant data was collected and is available for some sites). Similarly, testing did not address the pollen/phytoliths, chemical residues, or coprolites data needs in the subsistence domain, nor the use-wear data need in the technology domain. The recovered artifacts and samples may be further analyzed with respect to these data sets.

As a result, site research potential was assessed with respect to ten distinctly observable data sets plus the four red flag conditions and integrity of deposits. The primary data for each site have been presented in the individual site discussions in Chapters 5.0 and 6.0. These are reviewed in Table 7.4, which broadly summarizes for each site whether relevant data is present or absent, and whether the site meets any of the red flag conditions. In addition, Table 7.4 summarizes the integrity of deposits using a simplified three-point scale (good/moderate/poor).

For each site, these scores are summarized in the right four columns. The total number of different data sets present at each site is summarized in the data diversity column. However, a given site may rank relatively highly in a data diversity index but still have low overall research potential if the data (artifacts/features/samples) are sparsely distributed and/or are difficult to recover (relative to similar sites). Accordingly, the data abundance column reflects the frequency and density of artifacts and samples (see Table 7.2) using a simplified ordinal scale. Together with integrity, these columns are synthesized in the overall research potential column. Sites ranked with very high, high, or moderate research potential are recommended as eligible for inclusion to the NRHP while those with low research potential are recommended as not eligible. It must be emphasized that this table is provided as a convenience to the reader and broadly *summarizes the process* by which sites were evaluated. The evaluation of research potential and NRHP eligibility proceeded individually for each site and was *not* driven by a simplified checklist. The reader is encouraged to refer to Chapters 5.0 and 6.0 and to the data appendices for amplifying details of data diversity and abundance, and depositional integrity for each site.

The final column in Table 7.4 identifies NRHP eligibility. Of the 57 sites tested, 43 sites were determined to have significant research potential and are recommended as eligible for inclusion to the NRHP. These sites are: 41BL154, 41BL168, 41BL198, 41BL339, 41BL433, 41BL470, 41BL513, 41BL532, 41BL538, 41BL564, 41BL567, 41BL568, 41BL740, 41BL743, 41BL744, 41BL751, 41BL754, 41BL755, 41BL765, 41BL821, 41BL834, 41BL886, 41BL888, 41CV95, 41CV97, 41CV137, 41CV174, 41CV319, 41CV587, 41CV595, 41CV960, 41CV1007, 41CV1011, 41CV1023, 41CV1027, 41CV1038, 41CV1085, 41CV1105, 41CV1136, 41CV1167, 41CV1200, 41CV1391, and 41CV1423. These sites should be preserved and protected from adverse impacts. Protection efforts should be designed on a site-by-site basis, but in general, should include measures to prevent subsurface disturbance by vandalism, prevent mechanical or manual excavations by military personnel, and minimize the impact of traffic on the site surface, especially by heavy-tracked and wheeled vehicles. If protection is not possible for any site then adverse impacts should be mitigated by means of a carefully designed and implemented program of data recovery, conducted under a site-specific research framework that identifies and targets specific key data sets delineated in the overall research design (Ellis et

Table 7.4 Assessment of NRHP Eligibility of 57 Sites.

	RESEARCH DOMAINS										"RED FLAGS"					SUMMARY			
	CHRONOLOGY			SUBSISTENCE			TECHNOLOGY												
SITE	diagnostics	chronometrics	clear stratigraphy	macrobotanicals	faunal/shell	features	lithic tools	lithic debitage	lithic source IDs	other tools	thin bedded organic remains	multiple dateable occupations	human bone	Paleoindian / Early Archaic	depositional integrity	data diversity	data abundance	overall research potential	NRHP eligibility
41BL154	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	yes	good	very high	high	very high	E
41BL168	yes	yes	no	yes	yes	no	yes	yes	yes	no	no	no	no	no	moderate	high	very high	high	E
41BL198	yes	yes	no	no	yes	yes	yes	yes	yes	no	no	no	no	no	good	high	high	high	E
41BL208	yes	no	yes	no	no	yes	yes	yes	yes	no	no	no	no	no	poor	low	moderate	low	N
41BL339	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	no	no	moderate	high	high	very high	E
41BL415	no	yes	no	no	yes	yes	yes	yes	yes	no	no	no	no	no	poor	moderate	moderate	low	N
41BL421	no	no	no	no	no	no	no	no	no	no	no	no	no	no	poor	low	low	low	N
41BL427	no	no	no	no	no	no	no	no	no	no	no	no	no	no	poor	low	low	low	N
41BL432	no	no	no	no	no	no	no	no	no	no	no	no	no	no	poor	low	low	low	N
41BL433	yes	yes	no	yes	yes	no	yes	yes	yes	no	no	yes	no	no	good	high	very high	high	E
41BL454	no	no	no	no	no	no	no	no	no	no	no	no	no	no	poor	low	low	low	N
41BL470	yes	no	yes	no	yes	no	yes	yes	yes	no	no	yes	no	no	good	high	moderate	high	E
41BL513	no	no	yes	no	no	yes	yes	yes	yes	no	no	no	no	no	moderate	high	moderate	high	E
41BL532	yes	yes	no	no	yes	no	yes	yes	yes	no	no	yes	no	no	good	high	high	high	E
41BL538	no	no	no	yes	yes	yes	yes	yes	yes	no	no	no	no	no	moderate	high	low	moderate	E
41BL564	no	yes	no	yes	no	yes	yes	yes	yes	no	no	no	no	no	good	high	low	high	E
41BL567	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes	no	no	good	high	very high	high	E
41BL568	yes	no	no	yes	yes	yes	yes	yes	yes	no	no	no	no	no	good	high	high	high	E
41BL740	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	no	moderate	very high	high	high	E
41BL743	no	yes	no	yes	no	yes	no	yes	yes	no	no	no	no	no	moderate	high	high	high	E
41BL744	no	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes	yes	no	moderate	high	high	high	E
41BL751	yes	no	yes	no	yes	yes	yes	yes	yes	no	no	yes	no	no	moderate	high	high	high	E
41BL754	yes	yes	yes	yes	yes	no	yes	yes	yes	no	no	no	no	no	moderate	high	high	high	E
41BL755	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	no	yes	no	no	moderate	high	high	high	E
41BL765	no	no	no	yes	yes	no	yes	yes	yes	no	no	no	no	no	moderate	high	high	high	E
41BL821	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no	no	moderate	very high	very high	high	E
41BL834	yes	no	yes	yes	yes	no	yes	yes	yes	no	no	yes	no	no	moderate	high	high	high	E
41BL853	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	poor	low	low	low	N
41BL886	yes	yes	yes	yes	yes	no	yes	yes	yes	no	no	no	no	no	moderate	high	high	high	E
41BL888	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes	no	no	moderate	high	high	high	E
41CV95	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	no	good	very high	high	high	E
41CV97	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	good	very high	high	very high	E
41CV137	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	no	moderate	high	very high	high	E
41CV164	no	yes	yes	no	yes	no	no	no	no	no	no	no	no	no	moderate	low	low	low	N
41CV174	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	yes	moderate	very high	high	very high	E
41CV319	no	yes	yes	no	no	yes	yes	yes	yes	no	no	no	no	no	moderate	high	low	moderate	E
41CV587	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	no	no	no	no	moderate	high	high	high	E
41CV595	yes	yes	yes	no	yes	yes	yes	yes	yes	no	no	no	no	no	moderate	very high	high	high	E
41CV960	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	yes	moderate	high	high	high	E
41CV1007	yes	yes	yes	no	yes	yes	yes	yes	yes	no	no	yes	no	no	moderate	high	high	high	E
41CV1008	yes	yes	no	no	yes	no	yes	yes	yes	no	no	no	yes	no	poor	high	very high	low	N
41CV1011	yes	yes	no	yes	yes	no	yes	yes	yes	yes	no	no	no	no	moderate	high	very high	high	E
41CV1023	yes	no	yes	no	no	yes	yes	yes	yes	yes	no	no	no	no	moderate	high	high	high	E
41CV1027	yes	yes	no	yes	yes	yes	yes	yes	yes	no	no	no	no	no	moderate	high	low	moderate	E
41CV1038	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	moderate	very high	high	very high	E
41CV1085	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	no	no	moderate	high	high	high	E
41CV1097	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	poor	low	low	low	N
41CV1098	no	yes	yes	no	yes	yes	yes	yes	yes	no	no	no	no	no	moderate	high	low	low	N
41CV1099	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	moderate	low	low	low	N
41CV1105	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes	no	no	good	high	high	high	E
41CV1116	no	no	yes	no	yes	no	yes	yes	yes	no	no	no	no	no	poor	low	moderate	low	N
41CV1136	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	no	good	very high	moderate	very high	E
41CV1167	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no	moderate	very high	high	high	E
41CV1200	no	yes	yes	no	yes	yes	yes	yes	yes	no	no	yes	no	no	good	high	moderate	very high	E
41CV1391	yes	yes	yes	yes	no	yes	yes	yes	yes	no	no	yes	no	no	good	high	moderate	high	E
41CV1400	no	no	no	no	no	no	no	no	no	no	no	no	no	no	moderate	low	low	low	N
41CV1423	no	no	yes	no	yes	yes	yes	yes	yes	no	no	yes	no	no	moderate	high	high	high	E

al. 1994). For each site, appropriate levels of mitigative data recovery have been outlined in the respective site discussions in Chapters 5.0 and 6.0.

The remaining 14 sites were determined to have low overall research potential and are recommended as not eligible for inclusion to the NRHP. These sites are: 41BL208, 41BL415, 41BL421, 41BL427, 41BL432, 41BL454, 41BL853, 41CV164, 41CV1008, 41CV1097, 41CV1098, 41CV1099, 41CV1116, and 41CV1400. No further management is warranted for these sites.

7.3 PROGRAMMATIC RECOMMENDATIONS

As has been stressed several times previously (see Chapters 3.0 and 4.0), this report is concerned primarily with the data content, and thus the NRHP eligibility, of a limited number of sites on Fort Hood. However, in the process of conducting this fieldwork and the earlier investigations, a number of broader issues have naturally surfaced. The discussions in Chapters 8.0 and 9.0 provide some insight into the status and potential of several broader topics relevant to the sites examined during this phase of work. However, most of these discussions are strictly research-oriented with little consideration for management issues. In contrast, the bulk of the document is geared to address NRHP eligibility under the provisions of the Section 106 process and thus is fundamentally a management document.

Therefore, as with the preceding report (Trierweiler 1994), we have decided to conclude with a list of programmatic recommendations. These recommendations consist of specific areas of interest that we feel merit attention in the evolution of the Fort Hood archeological management program, either because they are essential to advancing our knowledge of the regional database or to effectively managing the cultural resources on the post. We have divided these recommendations into two sections. Section 7.2.1 organizes recommendations along topical lines and includes both suggestions for future research and the rationale for subsequent management recommendations. Section 7.2.2 recommends five policies that we feel should be incorporated into the existing Historic Preservation Plan in order to more effectively manage the prehistoric archaeological resources on Fort Hood.

<u>7.3.1 Topic-Specific Recommendations</u>

<u>7.3.1.1 Burned Rock Features</u>

As discussed in section 9.3, the long history of investigation of burned rock middens in Central Texas has so far failed to satisfactorily resolve any of the basic issues surrounding this suite of features, including questions of form, function, and chronology. We argue that much of this ambiguity is the result of an implicit and probably erroneous preconception that burned rock middens represent a single cultural phenomenon. While in truth many investigators (e.g., Hester 1970; Weir 1976; Peter 1982) have acknowledged variability between different "middens," the continued use of the single term "burned rock midden" has limited the potential for appreciation of this range of variability and effective communication between different investigators.

In our work, we have introduced a distinction between "burned rock middens" and "burned rock mounds" that we feel is analytically useful for features on the fort. This is not the only useful subdivision; on the contrary, we believe that our two classes still probably subsume a number of temporally, structurally and/or functionally disparate feature types. In short, we argue that meaningful advances in our understanding of Central Texas burned rock features will require detailed, multidisciplinary investigations using innovative techniques (as previously advocated by Collins [1991]) coupled with a renewed appreciation of the range and variability of feature types. Only when the term "burned rock midden" is abandoned as a pigeonhole for what appears to be a number of distinctive types of features, can meaningful communication between investigators commence.

In any case, Fort Hood represents a unique "laboratory" for quantum advancement in the burned rock feature database. Nowhere else in Central Texas does such a large, contiguous block of public property subsume so many relevant features in a variety of landscape positions. Because Fort Hood supports an active and innovative research program, these features are subject to examination under a consistent research design that has unparalleled potential to produce comparative data uncolored by differences in theoretical orientation or data recovery methods.

Despite this potential, the resource base is in danger. While unintentional impact by maneuvering military units is a factor in degradation of the resource, vandalism has been, and continues to be, the most serious problem by a considerable margin. Although the level of vandalism apparent in individual features varies considerably, very few of the hundreds of features examined during reconnaissance and testing have totally escaped the pothunter's shovel, and in some cases entire middens encompassing hundreds or even thousands of square meters appear to have been "mined" wholesale. While much of the vandalism may have occurred before the advent of cultural resource protection statutes, we have nonetheless observed fresh potholes on numerous features during the last three years. Thus, the recovery of information necessary to resolve many of the outstanding questions also represents a race with relic hunters intent on recovering monetarily valuable collectibles. At minimum, steps should be taken to increase the awareness among the Fort Hood military personnel of the scientific consequences and the statutory penalties of this type of activity, while the military police and game wardens should be periodically rebriefed on the cultural resource protection statutes.

7.3.1.2 Rockshelters

Rockshelters represent another very rich component of the archaeological record on Fort Hood, and likewise have tremendous potential to yield substantive cultural and paleoenvironmental data (see section 9.4). Unfortunately, because they are generally remote, quite easy to dig, and relatively rich in artifactual material, rockshelters are even more subject to vandalism than are burned rock features. Moreover, rockshelters often contain Native American burials and thus merit protection for a variety of scientific and ethical reasons. While the paleoenvironmental potential of rockshelters is largely sealed in the indurated tufa deposits that are unlikely to be seriously affected by vandals, this is not true of the cultural data, which is typically contained in loose, thin sediments that are vulnerable to unintentional disturbance by shelter visitors as well as rapid destruction by relic hunters.

In our opinion, the rate of shelter vandalism is far outstripping the pace of their effective management through the Section 106 compliance process. Like the burned rock features at Fort Hood, shelters represent a race between archeologists and vandals, and at this point, the archeologists are losing. We therefore recommend that management of NRHP eligible shelters be accelerated to include data recovery investigations. This urgency should be matched with increases in military education and access control as outlined above for burned rock features.

7.3.1.3 Paluxy Sites

These interesting sites appear to represent a fairly specific adaptation that may have distinctive temporal boundaries. The limited testing data from these sites clearly indicate that the previous proposition, that Paluxy sites contain abnormally low frequencies of artifacts (Abbott 1994b), is probably erroneous. Still, the data suggest that Paluxy sites contain pertinent and poorly understood data sets. We are of the opinion that the ambiguities inherent in the Paluxy phenomenon can only be adequately addressed if large-scale block excavations are coupled with diverse data recovery and analytical techniques. These investigations should include the broader site area because the limited testing information suggests that a variety of different types of activity areas

may be present within the larger site confines. In addition to standard archeological recovery techniques, aggressive recovery of faunal and macrobotanical data, soil-chemistry data, and geomorphic investigations should be an integral component of data recovery efforts.

At the same time, better data is needed to understand the landscape context of Paluxy sites. Although differences in vegetation are recognized between the Paluxy and surrounding calcareous substrates, identification and quantification of these assemblages are badly needed to allow better estimation of the resource potential of the Paluxy environment. At an even more fundamental level, the distribution of the substrate on the facility is in need of mapping to allow prediction of the distribution of potential resources and unidentified sites.

Unlike rockshelters and the majority of burned rock features on the fort, appreciable vandalism has not been observed in the Paluxy context, and the relatively low content of stone tools in Paluxy features probably renders vandalism a relatively minor problem at best. A far more serious problem is presented by the impact of tracked and wheeled vehicles, and accompanying erosion of the substrate. Many, if not most, of the Paluxy sites are known *because* of the severe erosion stimulated by roads crossing the outcrop; it is not uncommon to observe tank tracks incised a meter or more below the surrounding land surface. In our opinion, steps should be taken to minimize this impact on extant Paluxy sites by restricting tracked vehicles to existing roads: under no circumstances should maneuvering be allowed within the boundaries of identified NRHP eligible Paluxy sites.

7.3.1.4 Alluvial Sites

The thick alluvial fills of the principal Fort Hood streams (e.g., Cowhouse Creek, Table Rock Creek, North Nolan Creek, Owl Creek, etc.) are the settings of the most valuable sites on the base because at these locations discrete archeological occupations are buried in thick, relatively unambiguous stratigraphic context.

As specified in the Fort Hood CRMP for fiscal years 1995 through 1999 (U.S. Army 1994), machine excavations on Fort Hood require review by the base archaeologist, who can deny permission if the proposed activity will impact a known archeological site. However, this policy assumes that a complete and accurate site inventory exists. We maintain that while the existing inventory is adequate for effective management of the resource on the majority of the base, the lack of subsurface reconnaissance in the deep alluvial deposits is an obvious and serious gap in the existing site inventory. For this reason, the base archeologist does not have enough information to gauge the effect of such excavations in the alluvial environment *because no work has been done to determine if buried sites exist* in the proposed area.

We therefore recommend that some course of action be adopted to remedy the inadequate inventory of archeological sites in the deep alluvial contexts. Ideally, this would involve a preemptive inventory of the deep alluvial contexts through an extensive subsurface survey to flesh out the inventory and give the base archeologist the necessary tools to make informed management decisions. However, an alternative would be responsive investigation of specific areas as requested for use by training exercises. In this model, requests to perform mechanical excavations in the alluvial environment would have to be made by the military far enough in advance to allow for subsurface investigation of the affected area. Once cleared, the same area could then be used repeatedly for training purposes.

7.3.1.5 Geomorphology and Stratigraphy of Fort Hood

Our geomorphic and stratigraphic recommendations are essentially unchanged from those published previously (Trierweiler 1994). In short, we recommend that additional baseline and site-specific studies be conducted. The following

paragraphs outline the character of these recommended studies.

Additional baseline studies should be conducted on the alluvial sequences of smaller tributaries and the colluvial sequences preserved on hill slopes to compliment the existing work of Nordt (1992; 1993). This information is crucial to the development of a comprehensive model of geomorphic evolution of the Fort Hood landscape through the late Quaternary.

Additional studies of chert character and distribution should be conducted to compliment the work of Frederick and Ringstaff (1994). The geographically restricted nature of the extant chert studies imposes a particularly significant impediment to interpretation of chert data; subsequent studies should expand the area examined outside of the base proper and into the live fire and impact areas.

Finally, additional site-specific geomorphic investigations should be an integral part of all subsequent testing and data recovery site investigations on the fort. These studies are crucial to address site specific formation processes, yield paleoenvironmental and paleoeconomic data, and allow for refinement of Nordt's (1992) alluvial chronology.

7.3.1.6 Landsnail Dating Program

The snail-dating program is showing tremendous promise and should be continued. However, the data collection strategy to this point has yielded somewhat ambiguous data, particularly in regard to questions of integrity. The focus of investigation to this point has been on suites of snails from isolated levels; for this reason, it has often proven impossible to confidently ascertain whether the typical wide spread in A/I values obtained from individual assemblages is due to reworking of older specimens or differential heating of contemporary specimens. Therefore, subsequent investigations should concentrate on analysis of snail suites from several adjacent, stacked levels to allow discrimination between these two sources of error (see section 9.2). Also, additional AMS ages of snails should be pursued to better define the calibration curve and to assess the variability inherent in the radiocarbon age anomaly from individual snails.

7.3.2 Recommended Policies and Procedures

As the preceding discussions illustrate, the archeological resources on Fort Hood are rich in potential for scientific gain and yet are subject to ongoing and severe degradations. In our opinion, much of this degradation may be avoided by simply increasing the level of awareness and education in both the resident military population and in the surrounding civilian communities. Therefore, the following specific management recommendations are advanced as mechanisms to *slow* the rate of adverse impacts to NRHP eligible sites.

1) Because of the high potential for adverse impacts to fragile cultural deposits in rockshelters, *all rockshelters* at Fort Hood should be off-limits to all military and civilian personnel and off-limits notices should be posted in all NRHP eligible rockshelters whether they exhibit evidence of vandalism or not. To avoid attracting attention, the notices should be neutral in color and unobtrusively posted in the shelter interior. The notices should be posted by an archeologist and must not themselves result in an adverse impact. The notices should state that the area is an archeological site and is off-limits *by order of the Commanding General*. To facilitate prosecution under ARPA (if necessary), signs should explain that vandalism of archeological sites on a federal installation is a criminal act and should outline relevant penalties proscribed by law (Jameson and Kodack 1991:242).

2) Currently, all military personnel newly posted to Fort Hood receive a briefing summarizing the importance and scientific value of the archeological resources at Fort Hood. The

content of this briefing should be reviewed and, if necessary, revised to stress (a) the protected status of archeological sites under both ARPA and AR 420-40, and (b) the potential consequences of vandalism to the individual *and his/her superior officers*.

3) Fort Hood policy implementing the current CRMP (U.S. Army 1994) restricts mechanical excavation during training exercises within 50 m of a stream or drainage. Because NRHP eligible components have been demonstrated to occur on T_0 and T_1 terraces and especially on the toe slopes of these terraces further than 50 m (see for example 41BL339, 41CV97, 41CV960), and because no subsurface survey has been done to determine if buried sites exist in the alluvial terraces, the policy should be reexamined to determine the advisability of restricting all mechanical excavations on all T_0 and T_1 terraces and their toe slopes, regardless of distance from the stream or drainage.

4) Finally, tracked and wheeled vehicles have been demonstrated to be agents of significant adverse impact on some NRHP eligible archeological sites; Paluxy sites, in particular, appear extremely vulnerable to intensive erosion (see for example 41CV319, 41CV595). Because the existing Fort Hood CRMP (U.S. Army 1994) does not explicitly consider the direct and consequent impacts to readily erodible sites in the uplands, a policy should be developed which restricts vehicle traffic in the vicinity of known Paluxy sites to existing roads. Signs to this effect should be posted around the known NRHP eligible Paluxy sites.

8.0 LITHIC ANALYSIS

James T. Abbott and Marybeth S. F. Tomka

This chapter builds upon the results presented in Chapters 5.0 and 6.0 to develop several intersite analyses using the lithic data. Section 8.1 presents a spatial analysis of the distribution of chert artifacts of various identified material types with respect to their presumed source locations. This discussion is followed in section 8.2 by a closely related analysis of variability in lithic tools, including projectile points.

These analyses were performed using the procedures, definitions, and typologies described above in Chapter 4.0. However, after completing the analyses in this chapter, but before printing the final of this report, we updated the artifact database in preparation for the next phase of laboratory work.

As a result, the analyses conducted in this chapter may be considered to be a "snapshot in time" with occasional minor differences in artifact frequencies from those given in Chapters 5.0 through 7.0. A forthcoming report will conduct analyses similar to those in this chapter on the entire (and comparable) database.

Two updates to the lithic database were done. First, concurrent with conducting these analyses, field testing was conducted on an additional sample of 56 sites at Fort Hood. Before beginning the laboratory phase for this second sample, all lab methods and procedures were reviewed. On the basis of this review, some definitions were clarified and the typology of stone tools was slightly revised, especially for bifaces (including points), edge modified flakes, and utilized flakes. The new typology was applied to all materials recovered from the second sample of sites and will be documented in a forthcoming report. However, to ensure 100% comparability of data for all 113 of the sites tested, the affected tools were recoded using the new typology. Several hundred tools were reclassified and are curated using the new typology.

Second, after completing the analyses in this chapter but before printing the microfiche in Appendix C, a final quality control check was conducted on all artifacts prior to their curation. This check discovered a very small number of mistakes in the electronic database, chiefly due to keystroke errors. These errors were corrected prior to printing the microfiche. Changes to the text of this chapter were not made for two reasons: (1) the corrections were minor and did not change any substantive conclusions; and (2) the analyses will be immediately superseded at the completion of the next phase of analysis, when the sample size is increased to 113 sites.

8.1 LITHIC MATERIAL OCCURRENCE AND PREHISTORIC MOVEMENT

This section examines the intersite patterns of material occurrence and distribution in the debitage recovered from the 57 sites relative to the known patterns of outcrop and the characteristics of the various materials. The analysis is based on two different data sets: the flaked stone recovered from the 57 sites during the testing phase investigations, and the natural chert taxonomy and distribution determined by Frederick and Ringstaff (1994; see Appendix I), which is in turn an expansion of a taxonomy proposed by Dickens (1993). Clearly, the crux of the analysis is based on the visual identification of the material. There are several caveats and assumptions that must be considered in this discussion, the most important of which are presented below.

(1) One of the most obvious limitations to the analysis is imposed by the extent of known chert sources. Although the prehistoric landscape was essentially an open system, the imposition of the Fort Hood boundary on the spatial extent of investigation results in an artificial skewing of the knowledge about the

distribution of chert on the landscape and the sources of material found in archeological sites. This is not only true about areas outside the installation boundary, which are essentially unknown (although Leona Park and Owl Creek Black are both known to outcrop northeast of the fort), but also about the live fire and impact areas in the center of Fort Hood, which also remain largely unexamined. In other words, the known universe of sources is clearly a subset of the available sources, and is defined by the "doughnut" of maneuver areas that form the outer ring of the fort. Thus, while a specific chert type may be identified with a chert province on the opposite side of the post, there is no guarantee that the same type is not available much closer to the site where it was recovered, but outside of the post boundary or within Fort Hood's restricted live fire training areas.

(2) In a similar vein, it would be foolish to argue that the types and availability of various cherts within the examined "doughnut" are fully known. The existing taxonomy is based on a field survey that is far from exhaustive. Thus, additional types are probably present in each of the identified chert provinces (and in the alluvial Cowhouse province in particular), and more overlap in known chert types than those currently recognized probably exists between provinces. This clearly appears to be the case with Anderson Mountain Gray (see below), and is potentially a factor in many other of the identified types.

(3) Identification problems are a potentially important, yet difficult to evaluate, factor in the analysis. Clearly, the value of the analysis hinges on correct identification. With the exception of the microdebitage recovered from fine-screen and flotation samples, the recovered flaked stone from each site was examined piece by piece, and was categorized as one of the 28 recognized chert types or one of eight "indeterminate" categories (see section 4.2.2.1). There are a number of different error permutations that could arise from this system. Any given flake identified as a particular type could actually be (a) another, similar identified type; (b) an unidentified type that is available within the study area; or (c) an unknown type procured from outside the studied area. By the same token, a flake identified as an indeterminate type could actually represent (a) one of the identified types; (b) an unidentified type available in the examined area; or (c) an unidentified type from outside the examined area.

To minimize these errors, classification of the chert was performed relatively conservatively. As indicated in section 4.2, the analyst was unfamiliar with the geographic distribution of both the examined sites and known chert sources, and was thus not prone to identify questionable artifacts on the basis of geographic association. The number of artifacts analyzed in this manner totaled 55,879, and includes 62 cores, 54,302 pieces of debitage, 268 projectile points, and 1,238 other tools. A total of 8,460 specimens of microdebitage were also recovered, but were not analyzed in a like manner because (1) only selected portions of the total volume of sediment excavated were processed in a manner allowing microdebitage recovery, precluding its incorporation into the overall frequency counts, and (2) microdebitage is typically too small to possess the necessary diagnostic features needed to type it. Most of the analysis that follows is based on the large (i.e., greater than 1/4 inch) debitage sample, which gives the best statistical picture of chert movement through the procurement and manufacturing stages of tool life. While the cores impart a similar type of information, the low numbers recovered limit their utility to addressing the issue. The projectile point and tool data provide a view of chert movement following manufacture of the implements (see section 8.2). While small in comparison with the debitage, the information imparted by these assemblages provide valuable information that is not duplicated in the debitage assemblage.

The results of the debitage analysis are somewhat enigmatic, as only 27% of the recovered material could be equated with known types on the base. Figure 8.1 illustrates the size breakdown of the overall sample, which is strongly weighted toward medium to small flakes. While the smallest class shows a strong decrease, this is almost certainly due to the field and laboratory methods employed, which would not have resulted in complete recovery. We strongly suspect that microdebitage would be the most numerous size class if the entire matrix from all excavations had been collected and subjected to flotation to recover 100% of the content.

Although the frequency of recovery declines with increasing size, the percentage of flakes identified in each size class (Figure 8.2) shows the exact opposite trend. This suggests that identification is hampered considerably by small size, which serves to obscure or eliminate many of the traits needed to type a specimen. Thus, it appears likely that at least 50% of the material recovered probably represents known types procured within the present boundary of Fort Hood. This conclusion is bolstered by a 65% identification rate on cores from the sites. Interestingly, the projectile points and tools exhibit roughly similar identification ratios (46% and 58%, respectively), suggesting that movement of tools following manufacture has not substantially altered the composition of the assemblage.

Another suite of relevant characteristics consists of observations on the character of the cortex. Because the overall goal of the analysis was primarily to determine whether a site contained sufficient relevant data to render it eligible for the NRHP (rather than to recover all relevant data), detailed attribute analysis of the recovered debitage was not attempted (cf. section 4.2 and Crabtree 1982). Rather, the character of the assemblage was addressed with a few basic, rapidly made observations, including flake size (or rather, maximum dimension relative to a discrete set of preestablished "bin" sizes), cortex presence (absent, partial cortex on dorsal surface, entire dorsal surface cortical), and cortex abrasion (abraded, unabraded, indeterminate, or not applicable). In this system, it can be argued that initial lithic reduction (i.e., the production of blanks from raw material) should be represented by relatively large, cortical flakes, while latter-stage reduction (the production of tools from blanks) should be represented by relatively small, decortified flakes. While not always the case, this assumption was employed in interpreting the assemblages.

Another assumption employed in the interpretation of the data is that abrasion of the cortex is indicative of stream transport of the raw material, while a lack of abrasion is indicative of upland procurement. This too is probably not entirely accurate. Cortex abrasion could arise from intentional cultural processes (e.g., platform preparation during reduction), unintentional cultural processes (e.g., transport of several cortical clasts in a bag), or natural processes (e.g., mass movement on a slope). Moreover, the lack of noticeable abrasion is no guarantee that the relevant clast was not stream-procured. Nonetheless, the approach is believed to provide the best indication of procurement context available, and is employed in the analysis that follows (as well as in the individual site treatments in Chapters 5.0 and 6.0).

Despite the limitations outlined above, some very interesting patterns are apparent in the data. In the following discussion, two basic perspectives are employed to examine the relationship between sources and artifact distribution: first, the aggregate assemblage from each of the nine defined site groups is addressed; second, the distribution of each of the 28 identified chert types is examined. While these two perspectives indicate some intriguing trends, the suggestions offered below for the meaning of these trends should be considered initial, informal hypotheses subject to testing by more detailed investigations.

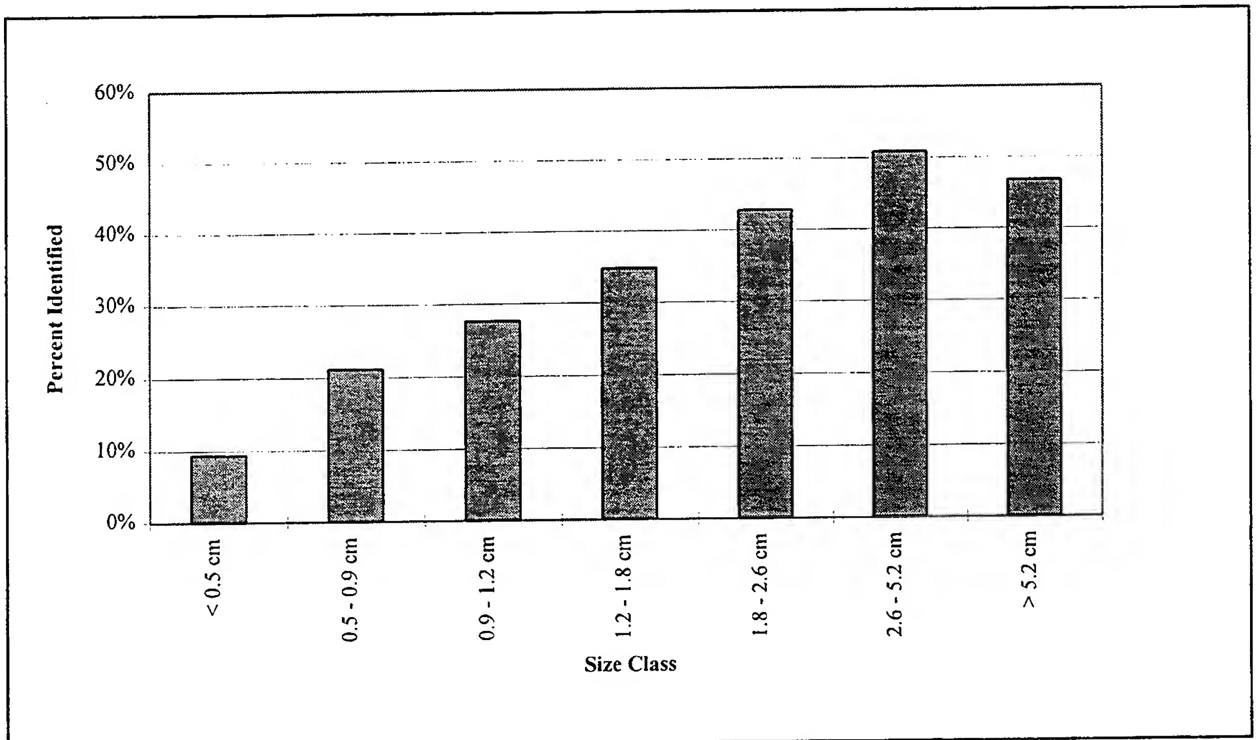


Figure 8.1 Debitage Analysis Results, by Sample Size.

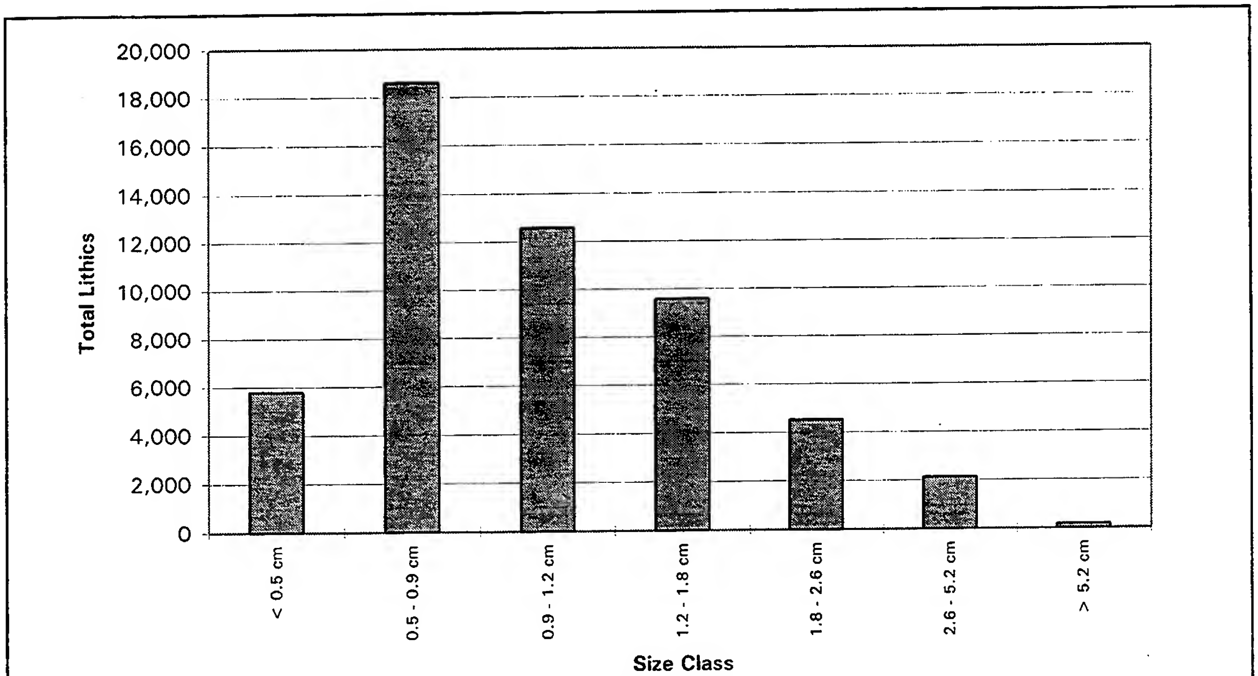


Figure 8.2 Debitage Analysis Results, by Percentage Identified.

8.1.1 East Range Site Groups

8.1.1.1 Nolan/South Group

Analysis of debitage from sites in the Nolan/South area of the fort suggests that the raw materials used at these sites were procured largely from resources occurring in the Southeast Range chert province (Figure 8.3). Almost 96% of the identified material consists of Southeast Range varieties (Table 8.1). Since these sites are located well within this province, in proximity to a variety of local outcrops, chert procurement apparently did not generally involve long-distance logistical missions. The most heavily represented chert type is Heiner Lake Translucent Brown (57% of the identified assemblage), although two other Southeast Range cherts (Heiner Lake Tan [30%] and Heiner Lake Blue [9%]) also occur with regularity. The other Southeast Range varieties (Cowhouse White, Fossiliferous Pale Brown, East Range Flecked, and Seven Mile Mountain Novaculite) each make up less than 1% of the identified assemblage, as do all individual types associated with the other three chert provinces.

The apparent preference for Heiner Lake Translucent Brown is somewhat surprising, given the unremarkable workability of the material and its tendency to occur in relatively small, fracture-ridden nodules (Frederick and Ringstaff 1994:Table 6.5). While Heiner Lake Tan is a moderate-quality material, the relatively poor quality of Heiner Lake Blue also belies its relative abundance. At the same time, the paucity of relatively usable Cowhouse White and East Range Flecked varieties in the assemblage is at first equally surprising. However, both of these types are only known to outcrop in the northeastern extreme of the Southeast Range province on the opposite (north) side of the Cowhouse Creek valley, and thus do not really represent "local" materials for any of the sites in the Nolan/South group. The paucity of Seven Mile Mountain Novaculite is not at all surprising given its poor workability, extreme hardness, and occurrence in small, spherical nodules that are quite difficult to reduce effectively. The workability characteristics of Fossiliferous Pale Brown are as yet unstudied, and it is therefore unclear whether the low representation of the material can be attributed to a lack of desirability, limited availability, or other unidentified factors.

Materials from the other three chert provinces collectively make up less than 5% of the identified assemblage. Given the very high quality of many of these materials (particularly the North Fort varieties) as well as the relatively high quality of more distant Southeast Range varieties, it appears that local availability was a much more important selection criterion than overall quality, especially when only the quality of material in the raw state is considered.

Heat treatment does generally improve the quality of Southeast Range material, and in some cases dramatically so. This treatment appears to have been practiced at least to some degree, based on discoloration and potlid fractures on some of the recovered material (although, admittedly, much of this alteration could be due to unintentional postdepositional burning of the debitage). Most of the deficiencies of the native Southeast Range cherts, and particularly the three well-represented varieties, can be ameliorated by heat treating the raw material. However, relatively few cortical flakes are preserved in the assemblage (roughly 8% of the total), suggesting that initial reduction was typically performed at the outcrop rather than at the sites. Therefore, when heat treatment was performed, it probably involved partially prepared cores rather than pristine nodules.

An interesting aspect of the cortical flakes is the relatively high percentage that appear to be stream-procured. Almost 79% of the cortical flakes on which a determination could be made exhibited abrasion of the cortex. Given that so much chert is currently available as lag on the upland surface, the presence of this much-abraded chert may indicate that conditions may have been somewhat different during the prehistoric period. If the current profusion of lag chert is due to clearing

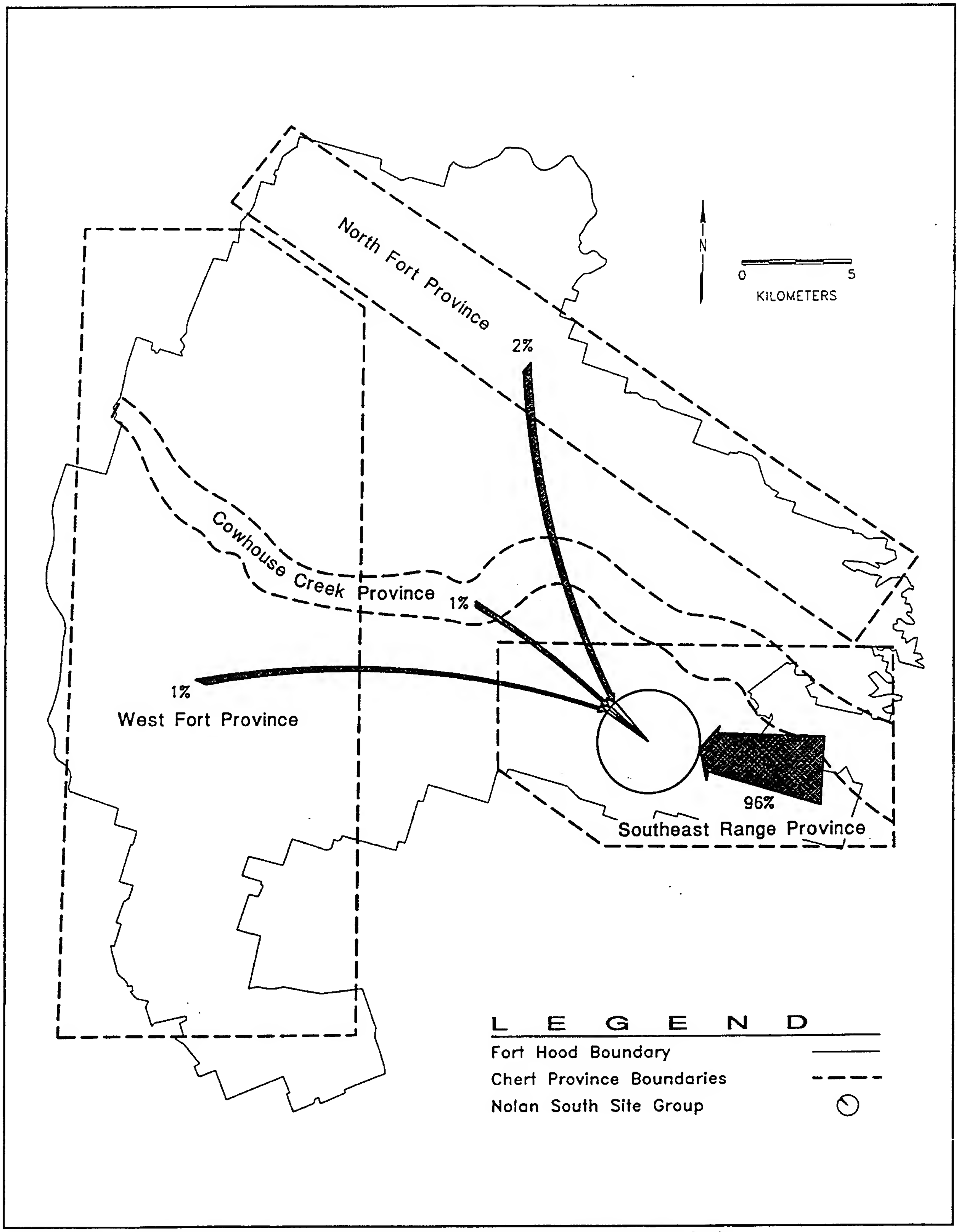


Figure 8.3 East Range Site Groups; Nolan/South Group Debitage Analysis.

Table 8.1 Nolan/South Group Chert Types.

Province	Chert Type	41BL154	41BL208	41BL740	41BL821	41BL834	Type Total	% of Identified	% of Total
Southeast Range	01 & 10-HL Blue	102	2	6	510	15	635	8.72%	3.16%
	02-C White	6	0	3	14	0	23	0.32%	0.11%
	06-HL Tan	17	5	25	2,082	26	2,155	29.59%	10.73%
	07-Foss Pale Brown	9	0	8	0	0	17	0.23%	0.08%
	09-HL Tr Brown	1,424	1	229	2,434	58	4,145	56.91%	20.64%
	13-ER Flecked	5	0	0	9	1	15	0.21%	0.07%
	04-7 Mile Novac	0	0	0	10	0	10	0.14%	0.05%
	Subtotal						7,000	96.10%	34.86%
West Fort	03-AM Gray	4	0	8	31	0	43	0.59%	0.21%
North Fort	05-Texas Novac	0	0	1	4	0	5	0.07%	0.02%
	08-FH Yellow	21	0	5	14	0	40	0.55%	0.20%
	11-ER Flat	1	0	0	0	0	1	0.01%	0.00%
	14-FH Gray	0	0	1	20	0	21	0.29%	0.10%
	15-Gry/Brn/Grn	17	0	4	2	2	25	0.34%	0.12%
	16-Leona Park	2	0	1	0	1	4	0.05%	0.02%
	17-Owl Crk Black	11	0	17	25	3	56	0.77%	0.28%
	Subtotal						152	2.09%	0.76%
Cowhouse	18-C Mottled	2	0	0	4	0	6	0.08%	0.03%
	19-C Dr Gray	1	0	0	0	0	1	0.01%	0.00%
	21-C Lgt Gray	0	0	0	4	0	4	0.05%	0.02%
	22-C Mott/Flecks	1	0	0	36	6	43	0.59%	0.21%
	23-C Mott/Banded	0	0	0	5	0	5	0.07%	0.02%
	26-C Striated	0	0	0	26	0	26	0.36%	0.13%
	28-Table Rock Flat	0	1	0	0	0	1	0.01%	0.00%
	Subtotal						86	1.18%	0.43%
Other	Quartz	0	0	0	3	0	3	0.04%	0.01%
Identified Subtotal		1,623	9	308	5,233	112	7,284		
Indeterminate Chert	Indet Black	14	0	0	75	0	89		0.44%
	Indet Dk Brown	238	2	51	4,531	12	4,834		24.08%
	Indet Dk Gray	67	1	18	205	3	294		1.46%
	Indet Lt Brown	1,166	32	124	2,596	382	4,300		21.42%
	Indet Lt Gray	202	0	64	1,078	77	1,421		7.08%
	Indet Misc.	329	0	26	1,018	31	1,404		6.99%
	Indet Mottled	12	1	4	21	4	42		0.21%
	Indet Trans	57	0	0	7	3	67		0.33%
	Indet White	123	3	13	176	26	341		1.70%
	Subtotal						12,792		63.71%
Grand Total		3,831	48	609	14,940	650	20,078		

and resulting erosion of the uplands following Anglo-American settlement, the availability of this material would have been much more limited and streambed procurement would have been a much more attractive option. This situation would also have favored use of smaller, more readily erodible and entrainable nodules (such as are characteristic of Heiner Lake Translucent Brown) over very large, discoidal nodules (as is typical of Heiner Lake Tan and Heiner Lake Blue), and may be one reason for the seeming preference for Heiner Lake Translucent Brown in the recovered assemblage. However, as will become apparent in the discussion that follows, a great deal of Heiner Lake Tan and, to a lesser extent, Heiner Lake Blue is present in the assemblages from other site groups, suggesting that it was always available.

As might be expected, the 293 tools recovered from the Nolan/South group are also dominated by Southeast Range cherts (83% of the total). Principal Southeast Range types include Heiner Lake Tan (39%), Heiner Lake Translucent Brown (31%), and Heiner Lake Blue (11%). Cowhouse and North Fort cherts are a distant second in preference at 10% and 6%, respectively.

8.1.1.2 Nolan/Cowhouse Group

Although still strongly dominated by "native" Southeast Range cherts (88% of the identified total), the debitage assemblage from the Nolan/Cowhouse group reflects a slight increase in the importance of varieties from the other provinces (Figure 8.4). As in the Nolan/South group, the assemblage is dominated by Heiner Lake Translucent Brown (32% of the identified total), Heiner Lake Tan (31.8%), and Heiner Lake Blue (12.4%) (Table 8.2). However, the relative importance of Heiner Lake Translucent Brown is strongly reduced (from 57% to 32%) in comparison to the Nolan/South assemblage to the benefit of both the other Southeast Range varieties and the cherts characteristic of other provinces. The remaining Southeast Range varieties (Cowhouse White, East Range Flecked, and Fossiliferous Pale Brown), which together accounted for less than 1% of the Nolan/South assemblage, here make up better than 12% of the assemblage. One of the primary reasons for this is the increased representation of Cowhouse White, which crops out on the North side of the lake and is thus closer to Nolan/Cowhouse than to Nolan/South. Similarly, "extra-province" cherts, which comprised less than 4% of the Nolan/South assemblage, here make up almost 12% of the identified total. Therefore, while the preponderance of locally available cherts suggests that logistical missions to collect high-quality material from distant localities were uncommon, such materials were occasionally obtained and used, possibly in conjunction with forays targeted at different suites of resources (an imbedded procurement strategy).

One of the most interesting and probably misleading aspects of the "extra-province" assemblage is the strong representation of Anderson Mountain Gray, which, at almost 7% of the identified total, is the fourth most commonly occurring type overall in the Nolan/Cowhouse group. Given that Anderson Mountain Gray has only fair workability unless heat treated (Frederick and Ringstaff 1994) and is identified with the distant West Fort province, its strong representation seems remarkable. However, it is likely that the material identified as Anderson Mountain Gray actually represents a similar, locally occurring chert, which has been noted in the field (Frederick, personal communication 1994) but has yet to be described. The remaining "exotics" are dominated by the high-quality North Fort cherts (Fort Hood Yellow, Fort Hood Gray, Owl Creek Black, and Gray/Brown/Green), while a wide variety of Cowhouse province cherts are also present in very low numbers.

Approximately 10% of the assemblage consists of cortical flakes, with primary decortification flakes (i.e., flakes with cortex covering the entire dorsal surface) making 0.5% of the total. Therefore, while most initial reduction appears to have occurred away from the sites (probably at the procurement localities), some early-stage reduction

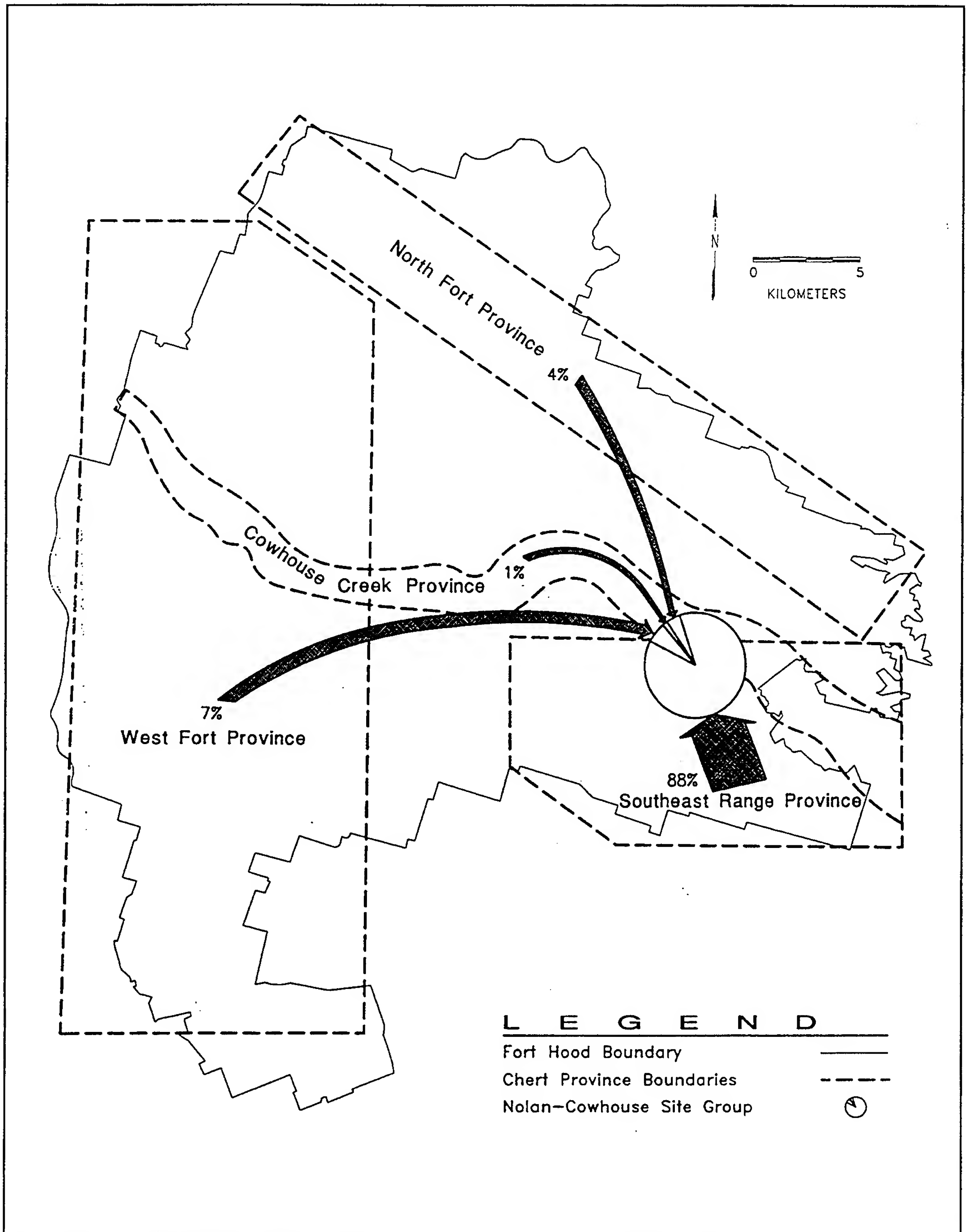


Figure 8.4 East Range Site Groups; Nolan/Cowhouse Group Debitage Analysis.

Table 8.2 Nolan/Cowhouse Group Chert Types.

Province	Chert Type	41BL168	41BL198	41BL433	41BL743	41BL744	41BL751	41BL754	41BL755	41BL765	41BL886	41BL888	Type Total	% of Identified	% of Total
Southeast Range	1&10-HL Blue	25	1	86	10	2	11	7	98	5	0	5	250	12.76%	2.42%
	02-C White	34	1	11	0	0	0	8	16	0	4	3	77	3.93%	0.74%
	06-HL Tan	93	8	146	5	2	7	106	187	20	7	43	624	31.84%	6.04%
	07-Foss Pale Brown	25	3	16	0	0	3	0	11	0	7	68	133	6.79%	1.29%
	13-ER Flecked	16	0	3	0	0	1	0	0	4	0	0	24	1.22%	0.23%
	09-HL Tr Brown	81	2	46	0	3	2	53	387	28	3	17	622	31.73%	6.02%
	Subtotal												1,730	88.27%	16.73%
West Fort	03-AM Gray	23	0	24	1	0	1	10	65	2	0	8	134	6.84%	1.30%
North Fort	08-FH Yellow	2	2	12	0	0	0	6	1	0	2	1	26	1.33%	0.25%
	11-ER Flat	1	0	0	0	0	0	0	0	0	0	1	2	0.10%	0.02%
	14-FH Gray	1	0	5	0	0	0	0	2	0	0	0	8	0.41%	0.08%
	15-Gry/Brn/Grn	1	0	8	0	0	1	0	1	0	0	0	11	0.56%	0.11%
	17-Owl Crk Black	11	0	14	0	0	1	2	6	0	0	1	35	1.79%	0.34%
	Subtotal												82	4.18%	0.79%
Cowhouse	18-C Mottled	0	0	3	0	0	0	0	1	0	0	0	4	0.20%	0.04%
	19-C Dr Gray	0	0	1	0	0	0	0	0	0	0	0	1	0.05%	0.01%
	20-C Shell Hash	0	0	0	0	0	0	0	0	1	0	0	1	0.05%	0.01%
	22-C Mott/Flecks	0	0	2	0	0	0	0	0	0	0	0	2	0.10%	0.02%
	23-C Mott/Banded	0	0	1	0	0	0	0	0	0	0	0	1	0.05%	0.01%
	27-C Novaculite	0	0	0	0	0	1	0	0	0	0	0	1	0.05%	0.01%
	Subtotal												10	0.51%	0.10%
Other	Quartz	0	0	0	0	0	0	2	0	0	0	2	4	0.20%	0.04%
Identified Subtotal		313	17	378		7	28	194	775	60	23	149	1,960		
Indeterminate Chert	Indet Black	10	1	24	0	0	0	1	1	1	0	0	38		0.37%
	Indet Dk Brown	224	6	699	20	14	62	62	58	25	11	27	1,208		11.69%
	Indet Dk Gray	84	8	254	42	2	8	21	70	6	16	22	533		5.16%
	Indet Lt Brown	656	31	2,525	99	87	144	437	250	47	250	217	4,743		45.88%
	Indet Lt Gray	214	15	336	16	16	28	114	74	18	13	22	866		8.38%
	Indet Misc.	68	10	268	40	0	0	51	68	1	11	41	558		5.40%
	Indet Mottled	0	3	10	1	0	6	6	0	0	4	8	38		0.37%
	Indet Trans	3	0	4	0	0	0	5	0	0	0	0	12		0.12%
	Indet White	78	1	61	60	5	18	37	62	1	15	44	382		3.70%
	Subtotal												8,378		81.04%
Grand Total		1,650	92	4,559	278	131	294	928	1,358	159	343	530	10,338		

is represented in the recovered assemblage. Moreover, in contrast to the Nolan/South group, the majority (62%) of recovered cortical flakes on which a determination could be made did not show the abrasion damage typical of streambed procurement. Therefore, it appears that upland chert was probably relatively more available in the Nolan/Cowhouse area than in the Nolan/South area. One possible explanation for this difference is the greater degree of dissection of the Manning surface, which would have facilitated greater sheet erosion of the upland margins and therefore potentially exposed more upland lag chert than was available in the adjacent Nolan/South area.

Southeast Range materials are also overwhelmingly dominant in the tool assemblage (n=89) from the Nolan/Cowhouse group (78% of the total), with Heiner Lake Tan (42%), Heiner Lake Translucent Brown (13%), and Heiner Lake Blue (17%) comprising the bulk of the assemblage. North Fort (11%) and Cowhouse (8%) comprise the bulk of the remaining assemblage.

8.1.1.3 East Cowhouse Group

The East Cowhouse group assemblage (Figure 8.5), while still dominated by Southeast Range varieties (58% of the identified total), reflects a substantially increased contribution from the North Fort Province (33% of the identified total; Table 8.3). At the same time, it evinces very little contribution from the Cowhouse province (5%), which is remarkable given the proximity of the Cowhouse Creek channel. Once again, Heiner Lake Tan, Heiner Lake Blue, and Heiner Lake Translucent Brown are the three most important Southeast Range cherts. However, Heiner Lake Translucent Brown (13.9% of identified total) illustrates a continued decline in importance relative to Heiner Lake Tan (24%) when compared to the site group (Nolan/Cowhouse) between it and the core of the Southeast Range. This indicates that the rate of distance-decay is considerably higher for Heiner Lake Translucent Brown than Heiner Lake Tan. At the same time, the relative importance of Cowhouse White and Fossiliferous Pale Brown is increased relative to the site groups in the core of the Southeast Range. Although the distribution of Fossiliferous Pale Brown within the Southeast Range is poorly known, the increase in Cowhouse White clearly indicates increasing proximity to the source in the northeast corner of Southeast Range.

North Fort varieties make up a third of the identified fraction. Three types are represented in more or less equal numbers (8% to 10% of the total each), while Fort Hood Yellow, so common on the western side of the base, makes up the least of the four represented types (roughly 6% of the identified total). The data suggests that forays into the North Fort province--whether expressly for the purpose of chert procurement or imbedded in other activities--were an important source of chert for the site inhabitants. Moreover, the chert types collected represent only a subset of available materials in the North Fort Province, suggesting that a moderate to high degree of selectivity was exercised in the procurement of the resource.

West Fort is represented in the assemblage by one type, Anderson Mountain Gray, that makes up 4% of the identified total. However, as in the neighboring site groups, there is reason to believe that this material probably represents a locally available, undescribed Southeast Range type rather than material procured from the distant West Fort Province (see the discussion of Anderson Mountain Gray below). Therefore, there is little evidence of raw material procurement from areas to the west of the site group.

The Cowhouse province is represented by three types that collectively make up slightly more than 5% of the identified total. Although Heiner Lake Translucent Brown is also known from the Cowhouse Creek bedload, the percentage given above assumes a Southeast Range source; to the extent that any of this material was procured from the channel, the relative importance of the Cowhouse Province is increased at the expense of the Southeast Range. Given that all of the sites are situated adjacent to Cowhouse Creek, this has

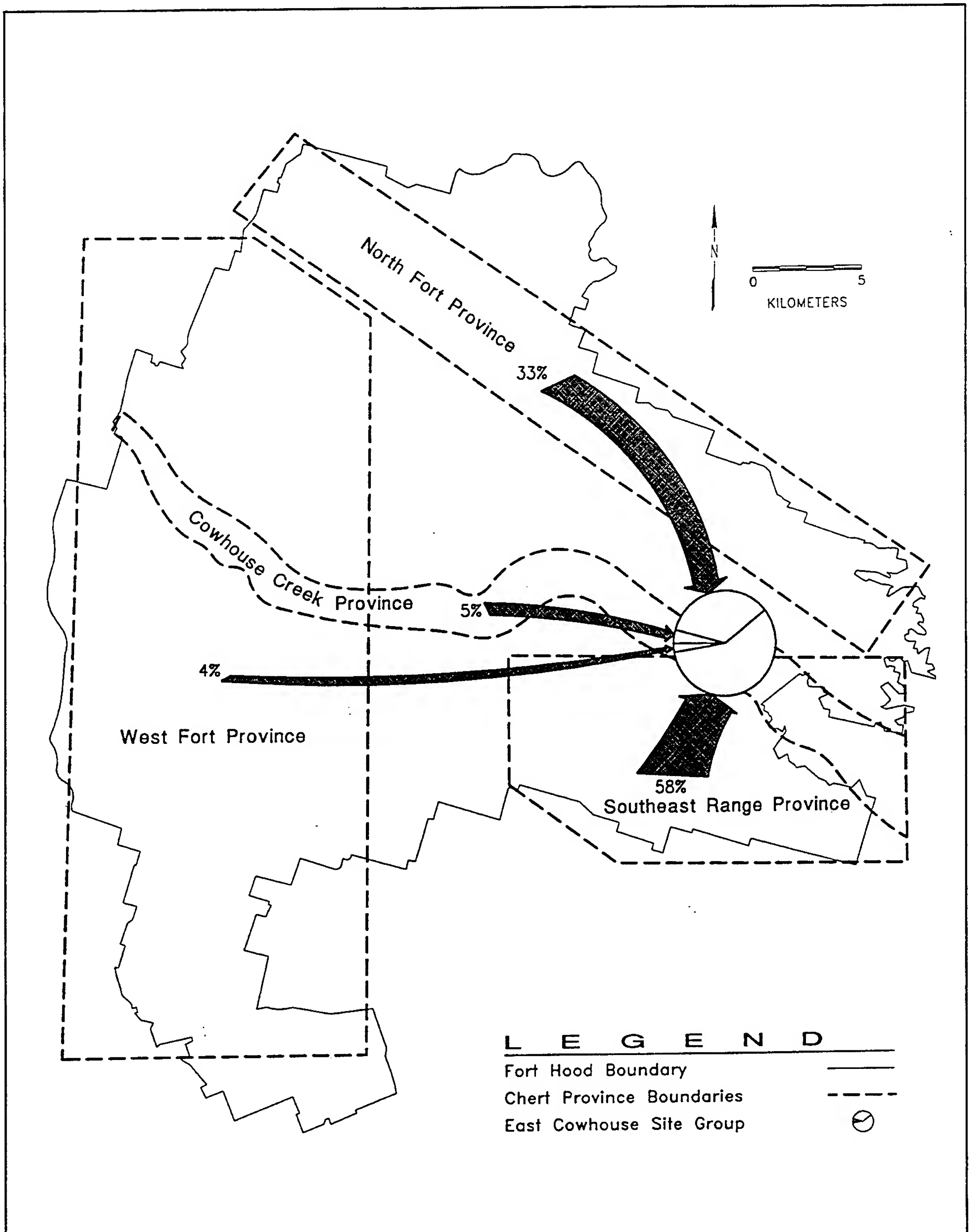


Figure 8.5 East Range Site Groups; East Cowhouse Group Debitage Analysis.

Table 8.3 East Cowhouse Group Chert Types.

Province	Chert Type	41BL339	41BL415	41BL470	Type Total	% of Identified	% of Total
Southeast Range	02-C White	8	0	0	8	4.57%	1.31%
	06-HL Tan	25	6	11	42	24.00%	6.85%
	07-Foss Pale Brown	7	2	1	10	5.71%	1.63%
	09-HL Tr Brown	14	8	2	24	13.71%	3.92%
	10-HL Blue	9	0	8	17	9.71%	2.77%
	Subtotal				101	57.71%	16.48%
West Fort	03-AM Gray	7	0	0	7	4.00%	1.14%
North Fort	08-FH Yellow	7	2	1	10	5.71%	1.63%
	14-FH Gray	9	0	6	15	8.57%	2.45%
	15-Gry/Brn/Grn	10	3	4	17	9.71%	2.77%
	17-Owl Crk Black	12	1	3	16	9.14%	2.61%
	Subtotal				58	33.14%	9.46%
Cowhouse	18-C Mottled	3	0	0	3	1.71%	0.49%
	22-C Mott/Flecks	5	0	0	5	2.86%	0.82%
	23-C Mott/Banded	0	1	0	1	0.57%	0.16%
	Subtotal				9	5.14%	1.47%
Identified Subtotal		116	23	36	175		
Indeterminates	Indet Dk Brown	24	4	7	35		5.71%
	Indet Dk Gray	6	2	1	9		1.47%
	Indet Lt Brown	109	125	59	293		47.80%
	Indet Lt Gray	8	10	3	21		3.43%
	Indet Misc.	15	0	0	15		2.45%
	Indet Mottled	1	0	0	1		0.16%
	Indet White	18	45	1	64		10.44%
	Subtotal				438		71.45%
Grand Total		297	209	107	613		

strong implications for the exploitation of alluvial chert. Although the frequency of cortex on the recovered flakes is significantly higher (20%) than in the Nolan South (8%) and Nolan/Cowhouse (10%) site groups, indicating that proportionally more early-stage reduction material is represented in the East Cowhouse assemblage, the proportion of cortical flakes exhibiting stream abrasion is reduced (32%, compared to 79% and 38% in the Nolan South and Nolan/Cowhouse groups, respectively). When coupled with the small proportion of Cowhouse province cherts in the assemblage, this indicates that alluvial gravel deposits were probably not particularly important raw material sources for sites in the East Cowhouse group. This seeming lack of reliance on lithic material from the Cowhouse channel is very counterintuitive, and may indicate that flow conditions in the channel during the late Holocene, when most of the sites in the East Cowhouse group were occupied, were not conducive to procurement. If flow in the channel tended to be relatively high and sustained, as Nordt (1992) suggests was the case during the deposition of the

late Holocene West Range alluvium, it is possible that exposed gravel bars were uncommon in the trunk stream. By the same token, Nordt (1992) suggests that increased precipitation resulted in greater mobilization of coarse gravels in the tributaries during the same period, which probably would have increased the availability of alluvial chert in the uplands, and may explain the observed difference in the proportion of stream-procured materials between the East Cowhouse site group and the site groups to the south.

Southeast Range cherts comprise 53% of the total tool assemblage, with Heiner Lake Tan comprising 32% of all cherts present. Cowhouse materials make up 32% overall, which dwarfs their representation in the debitage assemblage. North Fort materials make up 16% overall.

8.1.1.4 Cowhouse/Taylor/Bear Group

The Cowhouse/Taylor/Bear site group lies in the region between the Southeast Range and North Fort provinces. The recovered assemblage is dominated by material from these two provinces, which together make up 94% of the identified total (Figure 8.6). North Fort varieties are the most numerous, with five types comprising 51% of the identified total (Table 8.4). Owl Creek Black is the major North Fort type evident, while Fort Hood Yellow and Gray/Brown/Green are also significant contributors to the overall assemblage. In contrast, Fort Hood Gray and Texas Novaculite are relatively minor contributors; in fact, the latter is represented by only a single flake.

The Southeast Range province is represented by six types that comprise 43% of the identified assemblage. Once again, the principal types represented are Heiner Lake Tan, Heiner Lake Translucent Brown, and Heiner Lake Blue, and the relative proportion of Heiner Lake Translucent Brown to Heiner Lake Tan is again sharply reduced. Surprisingly, although the site group is situated on the north side of Cowhouse Creek relatively close to the outcrop of Cowhouse White, this material occurs in very low frequency. Also occurring in low frequency are East Range Flecked and Fossiliferous Pale Brown, which are represented by one flake each.

The West Fort province is represented by one type, Anderson Mountain Gray. As is the case in the other site groups on the east side of the base, it is likely that this material actually represents an unrecognized Southeast Range variety.

The Cowhouse province is represented by three types that collectively represent approximately 2% of the identified fraction, suggesting that material obtained from the Cowhouse channel was relatively unimportant. Although cortex is present on approximately 14% of the sample, the frequency of stream-abrasion on cortical flakes is quite low (6%), suggesting either that all sources of alluvial chert were used relatively sparingly, or that initial reduction of lithic material from the bedload of the tributary streams was generally performed before transporting partially prepared cores or blanks to the sites for latter-stage reduction.

Even though the sample size of tools is small, the Southeast Range cherts predominate at 68.75%; Heiner Lake Tan alone constitutes over 50% of the recovered tools. North Fort and Cowhouse materials are roughly equivalent in number, with 19% and 13%, respectively.

8.1.2 West Range Site Groups

8.1.2.1 West Cowhouse Group

Analysis of the debitage from sites in the West Cowhouse Group indicates that a variety of upland and alluvial chert sources were exploited. Overall, roughly 15% of the assemblage was identified. Slightly less than half (49%) of the identified material represents North Fort cherts, 36% represents Southeast Range cherts, 13% represents Cowhouse Province cherts, and just under 1.5% represents West Fort cherts (Figure 8.7, Table 8.5). Since the majority of cherts are from relatively distant sources (up to 25 km away) rather than the

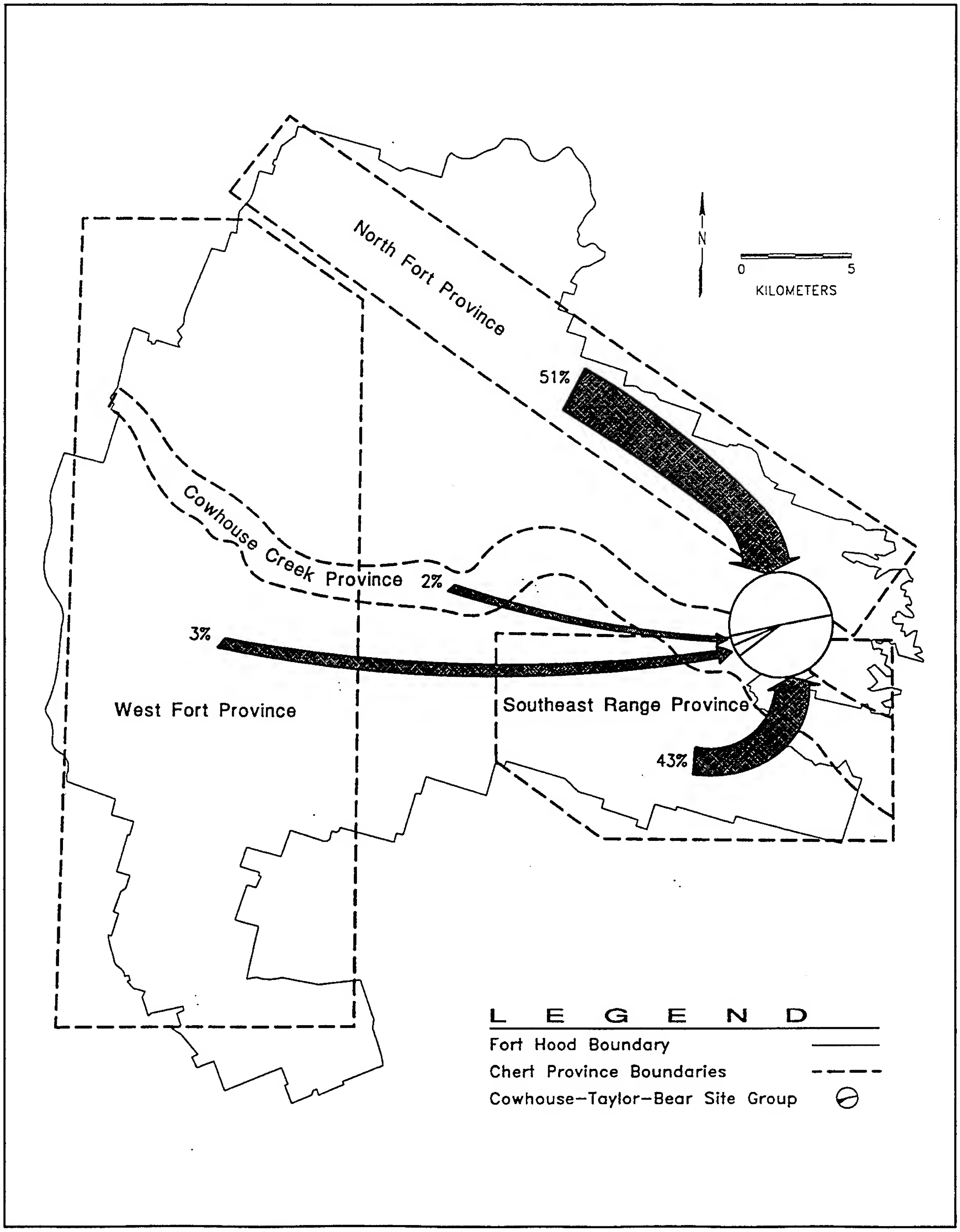


Figure 8.6 East Range Site Groups; Cowhouse/Taylor/Bear Group Debitage Analysis.

Table 8.4 Cowhouse/Taylor/Bear Group Chert Types.

Province	Chert Type	41BL513	41BL532	41BL538	41BL564	41BL567	41BL568	Type Total	% of Identified	% of Total
Southeast Range	1&10-HL Blue	0	0	0	1	10	2	13	6.37%	0.73%
	02-C White	0	0	0	0	0	2	2	0.98%	0.11%
	06-HL Tan	3	20	0	0	18	12	53	25.98%	2.96%
	07-Foss Pale Brown	0	0	0	1	0	0	1	0.49%	0.06%
	13-ER Flecked	0	0	0	0	1	0	1	0.49%	0.06%
	09-HL Tr Brown	0	18	0	0	0	0	18	8.82%	1.01%
	Subtotal							88	43.14%	4.91%
West Fort	03-AM Gray	0	0	0	0	1	5	6	2.94%	0.34%
North Fort	05-Texas Novac	0	0	0	0	1	0	1	0.49%	0.06%
	08-FH Yellow	4	0	0	0	12	5	21	10.29%	1.17%
	14-FH Gray	0	0	1	0	5	0	6	2.94%	0.34%
	15-Gry/Brn/Grn	1	0	0	0	11	2	14	6.86%	0.78%
	17-Owl Crk Black	10	38	0	0	8	6	62	30.39%	3.46%
	Subtotal							104	50.98%	5.81%
Cowhouse	18-C Mottled	0	0	0	0	2	0	2	0.98%	0.11%
	19-C Dr Gray	0	1	0	0	0	0	1	0.49%	0.06%
	23-C Mott/Banded	0	1	0	0	0	0	1	0.49%	0.06%
	Subtotal							4	1.96%	0.22%
Other	Quartz	0	0	0	0	2	0	2	0.98%	0.11%
Identified Subtotal		18	78	1	2	71	34	204		
Indeterminate Cherts	Indet Black	0	1	0	0	15	2	18		1.01%
	Indet Dk Brown	4	39	0	2	147	3	195		10.89%
	Indet Dk Gray	6	4	0	0	9	9	28		1.56%
	Indet Lt Brown	43	142	3	9	653	34	884		49.36%
	Indet Lt Gray	7	21	0	5	104	10	147		8.21%
	Indet Misc.	2	22	0	0	1	14	39		2.18%
	Indet Mottled	2	1	0	0	10	0	13		0.73%
	Indet White	3	19	0	0	22	15	59		3.29%
	Subtotal							1,383		77.22%
Grand Total		103	405	5	20	1,103	155	1,791		

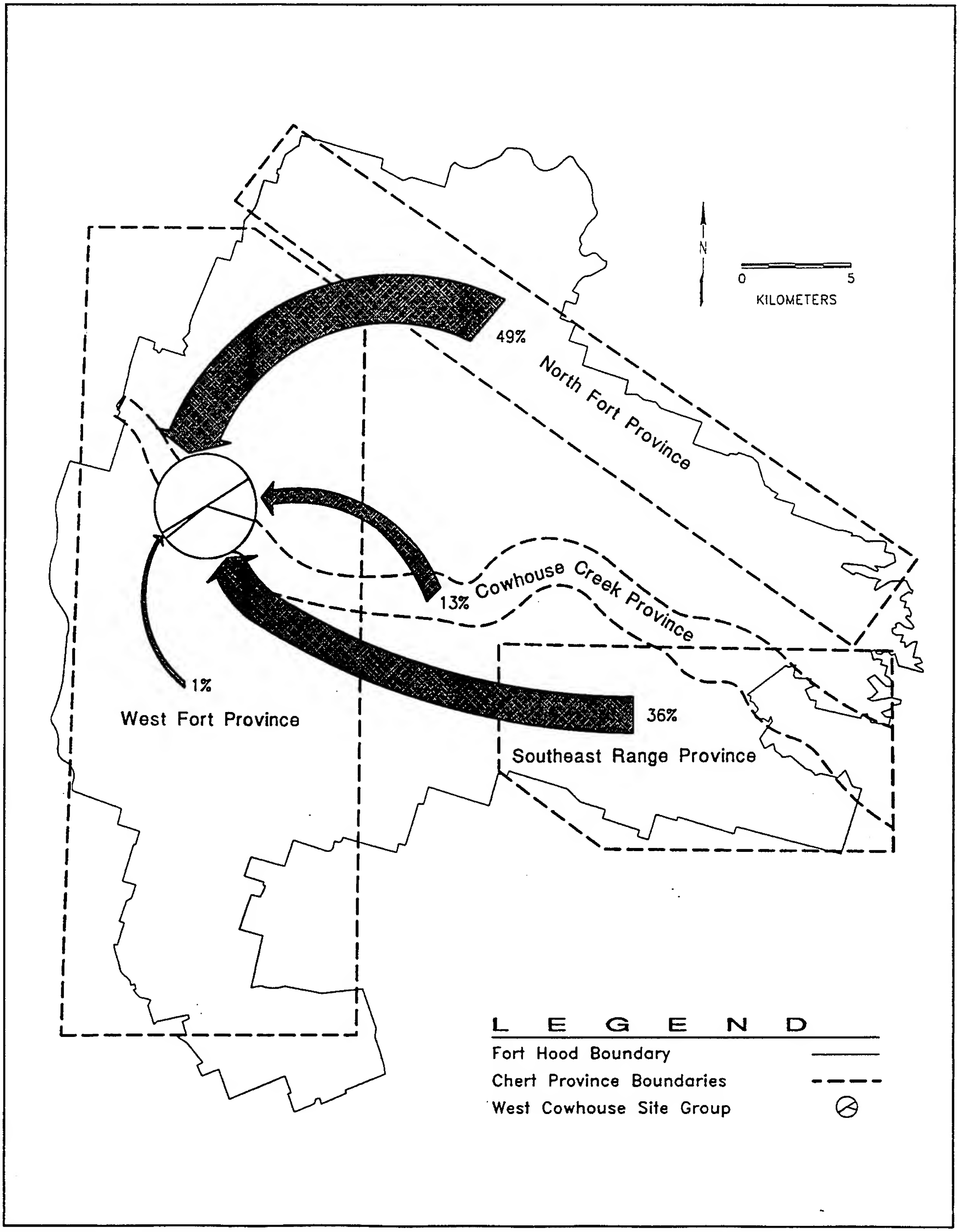


Figure 8.7 West Range Site Groups; West Cowhouse Group Debitage Analysis.

Table 8.5 West Cowhouse Group Chert Types.

Province	Chert Type	41CV1038	41CV1098	41CV1105	41CV1200	41CV95	41CV960	41CV97	Type Total	% of Identified	% of Total
Southeast Range	02-C White	0	0	0	0	0	5	6	11	0.92%	0.15%
	06-HL Tan	4	1	96	4	7	82	67	261	21.84%	3.51%
	07-Foss Pale Brown	0	0	1	0	0	2	19	22	1.84%	0.30%
	09-HL Tr Brown	2	0	5	5	1	20	86	119	9.96%	1.60%
	13-ER Flecked	0	0	0	0	0	4	0	4	0.33%	0.05%
	10-HL Blue	1	0	2	0	2	2	11	18	1.51%	0.24%
	Subtotal								435	36.40%	5.86%
West Fort	03-AM Gray	0	0	4	1	1	5	6	17	0	0
North Fort	05-Texas Novac	1	0	1	0	0	1	3	6	0.50%	0.08%
	08-FH Yellow	18	0	13	2	6	175	92	306	25.61%	4.12%
	11-ER Flat	0	0	1	0	0	2	0	3	0.25%	0.04%
	14-FH Gray	4	0	14	2	8	8	24	60	5.02%	0.81%
	15-Gry/Brn/Grn	0	0	5	0	5	3	64	77	6.44%	1.04%
	16-Leona Park	0	0	0	0	0	0	1	1	0.08%	0.01%
	17-Owl Crk Black	0	0	4	3	0	25	104	136	11.38%	1.83%
	Subtotal								589	49.29%	7.93%
Cowhouse	18-C Mottled	0	0	2	0	3	1	11	17	1.42%	0.23%
	19-C Dr Gray	5	0	0	6	0	10	22	43	3.60%	0.58%
	21-C Lgt Gray	3	0	0	0	0	0	2	5	0.42%	0.07%
	22-C Mott/Flecks	1	0	0	0	8	4	12	25	2.09%	0.34%
	23-C Mott/Banded	1	0	0	2	1	1	22	27	2.26%	0.36%
	24-C Br Fossil	0	0	0	0	0	0	1	1	0.08%	0.01%
	25-C Br Fleck	2	0	0	0	0	0	0	2	0.17%	0.03%
	26-C Striated	0	0	0	2	1	0	0	3	0.25%	0.04%
	28-Table Rock Flat	0	0	1	0	0	6	24	31	2.59%	0.42%
	Subtotal								154	12.89%	2.07%
Identified Subtotal		42	1	149	27	43	356	577	1,195		
Indeterminate Cherts	Indet Black	0	0	2	1	0	44	46	93		1.25%
	Indet Dk Brown	10	0	15	12	34	331	512	914		12.31%
	Indet Dk Gray	2	0	68	8	6	132	126	342		4.61%
	Indet Lt Brown	80	4	87	57	182	560	1,617	2,587		34.84%
	Indet Lt Gray	5	0	29	6	17	136	153	346		4.66%
	Indet Misc.	0	0	19	25	4	238	259	545		7.34%
	Indet Mottled	0	0	18	2	3	16	31	70		0.94%
	Indet Trans	2	0	0	0	0	28	38	68		0.92%
	Indet White	1	0	3	3	11	33	20	71		0.96%
	Subtotal								5,036		67.82%
Grand Total		184	6	539	168	343	2,230	3,956	7,426		

adjacent Cowhouse channel, logistical missions to obtain raw material (whether directed or imbedded) appear to have been very important. While still a relatively minor component of the assemblage, Cowhouse Province cherts are much more important in the West Cowhouse group than they are downstream in the East Cowhouse group, suggesting that alluvial chert was locally available at least part of the time in the western part of the base.

While the North Fort Province is represented by seven types, only four of these (Fort Hood Yellow, Fort Hood Gray, Gray/Brown/Green, and Owl Creek Black) are numerically important. Fort Hood Yellow is the single most common identified type in the entire assemblage, and makes up almost 26% of the identified total, while Owl Creek Black, at slightly over 11% overall, is the third most common identified type. In contrast, Texas Novaculite, East Range Flat, and Leona Park collectively make up less than 1% of the identified total, indicating that they were clearly not preferred materials.

The Southeast Range is represented by six identified types, but only two of these types (Heiner Lake Tan and Heiner Lake Translucent Brown) occur in appreciable numbers. They represent the second and fourth most common types overall, and together with the two dominant North Fort types, comprise almost 70% of the identified fraction. The remaining four Southeast Range types (Cowhouse White, Fossiliferous Pale Brown, East Range Flecked, and Heiner Lake Blue) each comprise less than 2% of the identified assemblage.

Although it is nominally a "local" province, West Fort materials comprise less than 2% of the identified total. In fact, while the site group is within the broad boundary of the West Fort province as defined by Frederick and Ringstaff (1994), the chert outcrops are restricted to the high Manning surface on the northern and southern ends of the province, and are not available in the vicinity of any of the West Cowhouse sites. The low frequency of the West Fort materials is probably a reflection of a lack of local availability, which would have limited expedient use, coupled with the medium to low quality of the material (Frederick and Ringstaff 1994), which would have reduced its desirability and hence the tendency for long-range logistical procurement targeting the materials as a resource. The small fraction of West Fort materials present in the assemblage probably represents opportunistic procurement behavior imbedded in forays targeting other resources, possibly supplemented by material procured from the Cowhouse and/or Table Rock channels (where it could be expected to occur but has not been documented).

Cowhouse province cherts make up slightly less than 13% of the overall assemblage. To the extent that the Heiner Lake Translucent Brown in the recovered assemblage actually represents material procured from the channel rather than from the Southeast Range (which is assumed), this fraction could actually be up to almost a quarter of the identified total. However, the remaining Cowhouse materials are represented by nine types, each of which comprises no more than 3.6% of the total. This relatively low frequency of a wide variety of material is consistent with opportunistic procurement of a variety of materials from the Cowhouse bedload, and suggests that probably no more than 3% to 4% of the Heiner Lake Translucent Brown was procured locally.

Cortex is present on approximately 15% of the identified flakes from the West Cowhouse group. Approximately 75% of these cortical flakes exhibit stream abrasion, suggesting that the majority of early reduction material was procured locally, while the material from the relatively distant chert provinces was typically imported to the sites in a partially reduced state.

Southeast Range materials comprise 42% of the tool assemblage, with 24% of the total representing Heiner Lake Tan and 13.4% representing Heiner Lake Translucent Brown. Cowhouse materials constitute 29% of the total, with Cowhouse

Mottled/Flecked the single most important Cowhouse Province type at 11.2%. North Fort Materials contribute 28.4% of the materials; Fort Hood Yellow is the most prevalent type at 9% of the total.

8.1.2.2 Table Rock Group

The Table Rock group is represented by five sites (Figure 8.8, Table 8.5). Only approximately 13% of the recovered debitage was identified. This material is fairly evenly divided between the North Fort (34%), Southeast Range (33%) and Cowhouse (27%) provinces, with the West Fort representing a distinctly less important source (6%). Two individual types make up approximately 40% of the identified assemblage: Heiner Lake Tan from the Southeast Range, and Fort Hood Yellow from the North Fort. Important secondary types include Heiner Lake Translucent Brown, Anderson Mountain Gray, Owl Creek Black, Cowhouse Mottled, Cowhouse Dark Gray, and Cowhouse Mottled/Flecked. None of the other types exceed 5% of the identified total, but several other types occur in frequencies of 3% to 4%. The indeterminates are dominated by light brown flakes, suggesting that both Heiner Lake Tan and Fort Hood Yellow may be represented in higher frequency than indicated, while the low frequency of indeterminate black, translucent, and mottled materials suggests that Owl Creek Black, Heiner Lake Translucent Brown, Cowhouse Mottled, and Cowhouse Mottled/Flecked are probably less important overall than is suggested by the ratios of identified materials.

The Table Rock Site Group lies in the midst of a fairly extensive chertless (or very chert-poor) terrain, suggesting that logistical missions to procure raw material were a necessity. The fairly even distribution of materials from the three provinces indicates that no single source was favored, suggesting that procurement may have been an opportunistic, subsidiary activity embedded in forays designed to exploit other resources. Interestingly, Table Rock Flat, which is the only chert type documented from the Table Rock bedload, is one of the scarcest material types in the assemblage, suggesting that little effort was expended to procure material locally.

Cortex is present on almost 20% of the assemblage. Given that the material appears to have been procured relatively far afield, this relatively high frequency of cortical flakes is rather surprising, as it appears to imply that relatively little initial reduction was performed at the procurement localities. However, this is consistent with an imbedded procurement strategy, because it is less likely that the time necessary to perform initial reduction of materials at the source would be taken if the principal reason for the foray was something other than raw material procurement. Moreover, 66% of the cortical flakes exhibit surface abrasion, suggesting that this pattern was probably most common in materials obtained from the Cowhouse bedload, which is the closest of the relevant provinces and thus represents only a few kilometers transport, rather than the tens of kilometers represented by the Southeast Range and North Fort provinces.

The recovered flaked stone tools are almost evenly divided between Southeast Range (32%), North Fort (32%), and Cowhouse province materials (36%). Heiner Lake Tan (23%), Cowhouse Mottled/Flecked (17%), and Gray/Brown/Green (14%) are the most common individual types.

8.1.2.3 Stampede Group

The Stampede group consists of three sites underlain by the Paluxy substrate (41CV1023, 41CV1027, and 41CV595) which yielded a fairly small debitage assemblage, of which roughly 18% was identified (Figure 8.9, Table 8.7). Almost 59% of this identified fraction represents the North Fort Province, while roughly 30% represents the Southeast Range, 11% represents the Cowhouse Province, and less than 1% represents the West Fort Province. Indeterminate light brown chert dominates the assemblage overall, and indeterminate white and dark gray cherts also comprise a significant fraction.

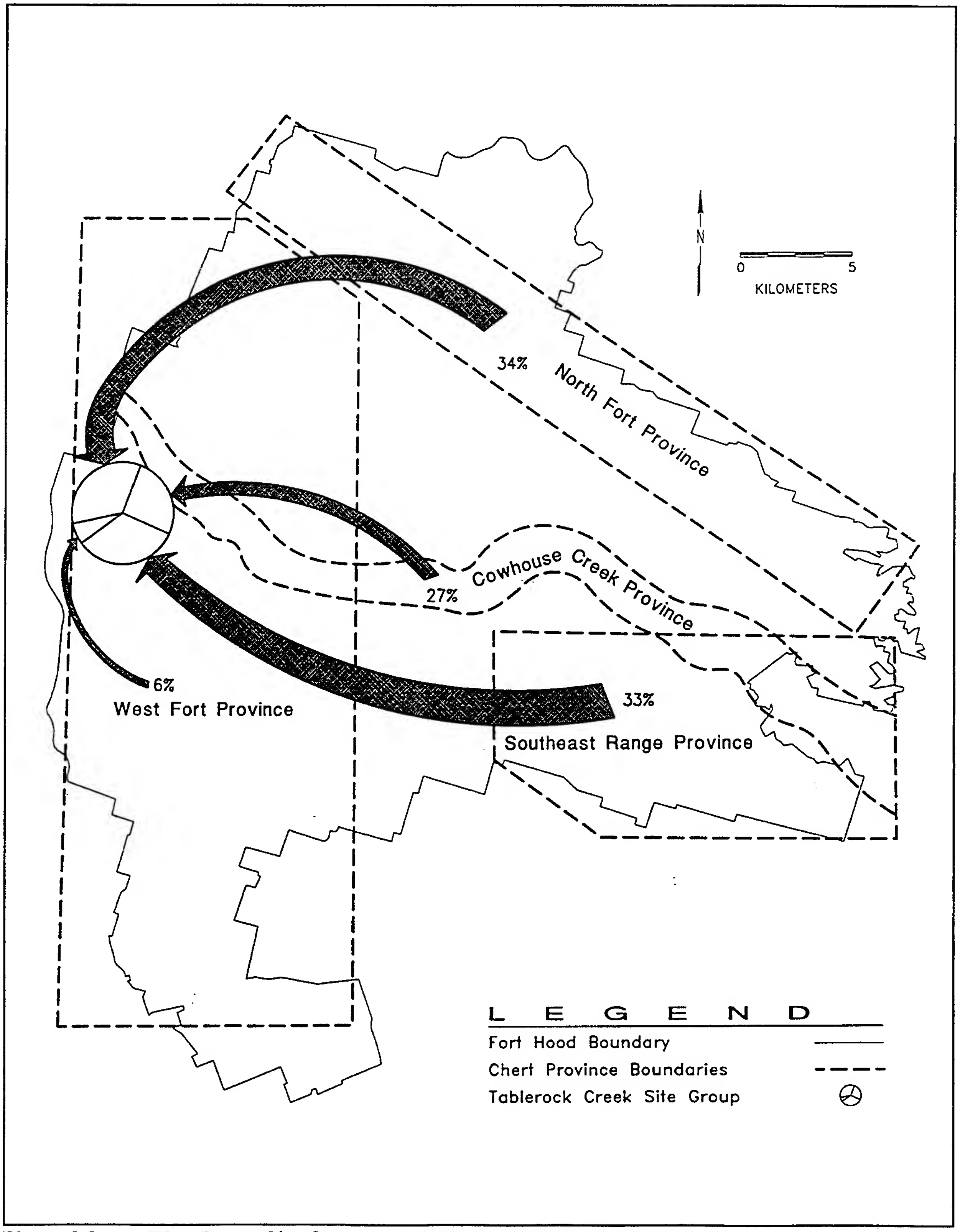


Figure 8.8 West Range Site Groups; Table Rock Group Debitage Analysis.

Table 8.6 Table Rock Group Chert Types.

Province	Chert Type	41CV1116	41CV1136	41CV1423	41CV174	41CV319	Type Total	% of Identified	% of Total
Southeast Range	02-C White	0	0	0	0	1	1	0.52%	0.07%
	06-HL Tan	0	1	27	14	0	42	21.99%	2.94%
	07-Foss Pale Brown	0	0	1	1	0	2	1.05%	0.14%
	09-HL Tr Brown	2	1	0	7	0	10	5.24%	0.70%
	10-HL Blue	1	2	0	5	0	8	4.19%	0.56%
	Subtotal						63	32.98%	4.41%
West Fort	03-AM Gray	5	0	0	6	0	11	5.76%	0.77%
North Fort	08-FH Yellow	4	3	4	21	3	35	18.32%	2.45%
	14-FH Gray	0	1	0	3	2	6	3.14%	0.42%
	15-Gry/Brn/Grn	0	5	0	4	0	9	4.71%	0.63%
	17-Owl Crk Black	2	5	6	2	0	15	7.85%	1.05%
	Subtotal						65	34.03%	4.55%
Cowhouse	18-C Mottled	1	2	0	13	0	16	8.38%	1.12%
	19-C Dr Gray	0	5	0	5	0	10	5.24%	0.70%
	21-C Lgt Gray	0	0	0	2	0	2	1.05%	0.14%
	22-C Mott/Flecks	0	2	0	9	0	11	5.76%	0.77%
	23-C Mott/Banded	0	0	0	7	2	9	4.71%	0.63%
	26-C Striated	0	2	0	0	0	2	1.05%	0.14%
	27-C Novaculite	0	0	0	1	0	1	0.52%	0.07%
	28-Table Rock Flat	1	0	0	0	0	1	0.52%	0.07%
	Subtotal						52	27.23%	3.64%
Identified Subtotal		16	29	38	100	8	191		
Indeterminate Cherts	Indet Black	0	2	5	3	1	11		0.77%
	Indet Dk Brown	11	17	28	76	0	132		9.24%
	Indet Dk Gray	15	2	5	17	5	44		3.08%
	Indet Lt Brown	44	132	66	403	7	652		45.66%
	Indet Lt Gray	24	5	20	37	7	93		6.51%
	Indet Misc.	11	0	3	21	8	43		3.01%
	Indet Mottled	0	1	5	10	1	17		1.19%
	Indet Trans	0	1	0	12	0	13		0.91%
	Indet White	22	5	8	5	1	41		2.87%
	Subtotal						1,046		73.25%
Grand Total		159	223	216	784	46	1,428		

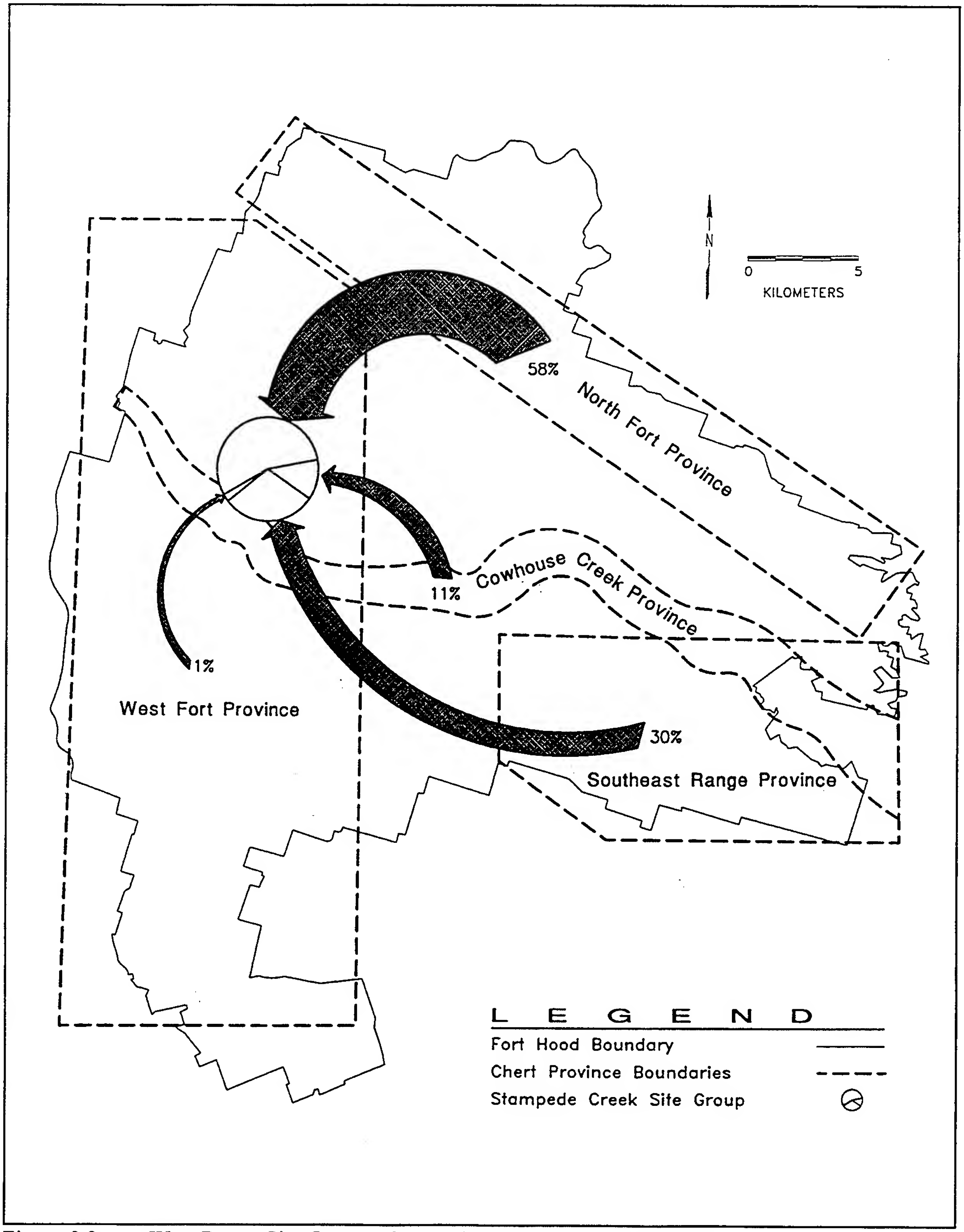


Figure 8.9 West Range Site Groups; Stampede Group Debitage Analysis.

Table 8.7 Stampede Group Chert Types.

Province	Chert Type	41CV1023	41CV1027	41CV595	Type Total	% of Identified	% of Total
Southeast Range	02-C White	0	0	6	6	4.44%	0.78%
	06-HL Tan	1	7	16	24	17.78%	3.14%
	07-Foss Pale Brown	0	0	2	2	1.48%	0.26%
	09-HL Tr Brown	0	0	7	7	5.19%	0.92%
	10-HL Blue	0	0	1	1	0.74%	0.13%
	Subtotal				40	29.63%	5.23%
West Fort	03-AM Gray	0	0	1	1	0.74%	0.13%
North Fort	08-FH Yellow	11	0	45	56	41.48%	7.32%
	04-7 Mile Novac	0	0	1	1	0.74%	0.13%
	14-FH Gray	0	0	7	7	5.19%	0.92%
	15-Gry/Brn/Grn	0	0	1	1	0.74%	0.13%
	17-Owl Crk Black	9	0	5	14	10.37%	1.83%
	Subtotal				79	58.52%	10.33%
Cowhouse	18-C Mottled	0	0	3	3	2.22%	0.39%
	22-C Mott/Flecks	0	0	6	6	4.44%	0.78%
	23-C Mott/Banded	0	0	3	3	2.22%	0.39%
	27-C Novaculite	0	0	3	3	2.22%	0.39%
	Subtotal				15	11.11%	1.96%
Identified Subtotal		21	7	107	135		
Indeterminate Chert	Indet Black	2	0	3	5		0.65%
	Indet Dk Brown	8	1	35	44		5.75%
	Indet Dk Gray	0	6	64	70		9.15%
	Indet Lt Brown	158	28	147	333		43.53%
	Indet Lt Gray	0	5	24	29		3.79%
	Indet Misc.	2	7	40	49		6.41%
	Indet Mottled	1	2	5	8		1.05%
	Indet Trans	4	0	6	10		1.31%
	Indet White	14	26	42	82		10.72%
	Subtotal				630		82.35%
Grand Total		210	82	473	765		

The North Fort province is represented by five types, but only Fort Hood Yellow, Owl Creek Black, and Fort Hood Gray occur in appreciable numbers (41%, 10%, and 5% of the identified fraction, respectively). While the low incidence of unidentified black material suggests that Owl Creek Black is probably overrepresented in the identified fraction, the relatively large indeterminate light brown and indeterminate dark gray classes suggest that Fort Hood Yellow and Fort Hood Gray may be underrepresented.

Southeast Range is also represented by five types. Again, only three of these types (Heiner Lake Tan, Heiner Lake Translucent Brown, and Cowhouse White) occur in appreciable numbers (17%, 5%,

and 4% of the identified total, respectively). While the low incidence of indeterminate translucent material suggests that Heiner Lake Translucent Brown is probably overrepresented, much of the indeterminate material may also represent Heiner Lake Tan and Cowhouse White.

The Cowhouse province is represented by four types that range from approximately 2% to 4% of the total. West Fort is represented by a single flake of Anderson Mountain Gray. Therefore, neither of these relatively close provinces appears to be a particularly important source of chert. It is conceivable that a considerable fraction of the indeterminate material was recovered from the Cowhouse channel. However, cortical flakes only comprised 12% of the assemblage, and the frequency of stream-abraded cortex (44% of cortical flakes) was far from overwhelming, which lends little support to this hypothesis.

Very few flaked stone tools (n=7) were recovered from the Stampede Group. The Cowhouse and North Fort provinces are each represented by three (43%) tools, while West Fort is represented by one tool (14%). No Southeast Range materials are evident in the tool assemblage.

8.1.2.4 Shell Mountain Group

The Shell Mountain group consists of six sites (41CV1007, 41CV1011, 41CV1085, 41CV1167, 41CV137, and 41CV587) that yielded a moderately large debitage assemblage (Figure 8.10, Table 8.8). Overall, roughly 22% of the assemblage was identified. The identified fraction was dominated by North Fort cherts (74%), while Southeast Range exhibited a distinctly secondary importance (20%), and West Fort and Cowhouse were present at a background level, 2% and 4%, respectively.

North Fort cherts are overwhelmingly dominated by Fort Hood Yellow (61% of the identified total). While Owl Creek Black forms an important secondary North Fort type (at slightly more than 9% of the total), the remaining types are each present in amounts less than 2% of the total. In fact, Leona Park is represented by only a single flake.

Similarly, the Southeast Range province is dominated by a single type (Heiner Lake Tan); the remaining five types each make up no more than 1.25% of the identified total. This pattern suggests that clear preferences for specific chert types existed, and may indicate that direct logistical procurement forays to specific chert outcrops occurred. The West Fort and Cowhouse provinces are distinctly less important, making up 2% (one type) and 4% (seven types) of the identified total, respectively. Light brown flakes dominate the indeterminate assemblage, but light gray, dark gray, and dark brown flakes also occur in appreciable numbers.

Finally, a small sample of other materials, including one obsidian flake and two reddish purple quartzite flakes (actually a single broken flake) was also recovered. The obsidian flake represents long-distance trade, apparently with people on the northern Plains. However, the purple quartzite, which was used extensively in other areas as a lithic material, probably represents a local material that was rarely used for flaked stone implements. Similar materials occur on the uplands as ancient lag gravels. These cobbles are commonly found with battering scars in sites on the base, suggesting that the material was commonly used for hammerstones. It is possible that the quartzite flake represents material incidentally detached from such an implement during use rather than an intentional flake.

The frequency of cortical flakes in the assemblage was 7.2%, which is the lowest of the nine site groups. One conclusion that can be drawn from this low percentage is that most raw material was imported in a partially reduced state to minimize the long-distance transport weight. However, the second lowest frequency of cortical flakes occurred in the Nolan/South group, which sits in the midst of the abundant cherts of the Southeast Range province. Although little material has been systematically described from the Manning surface

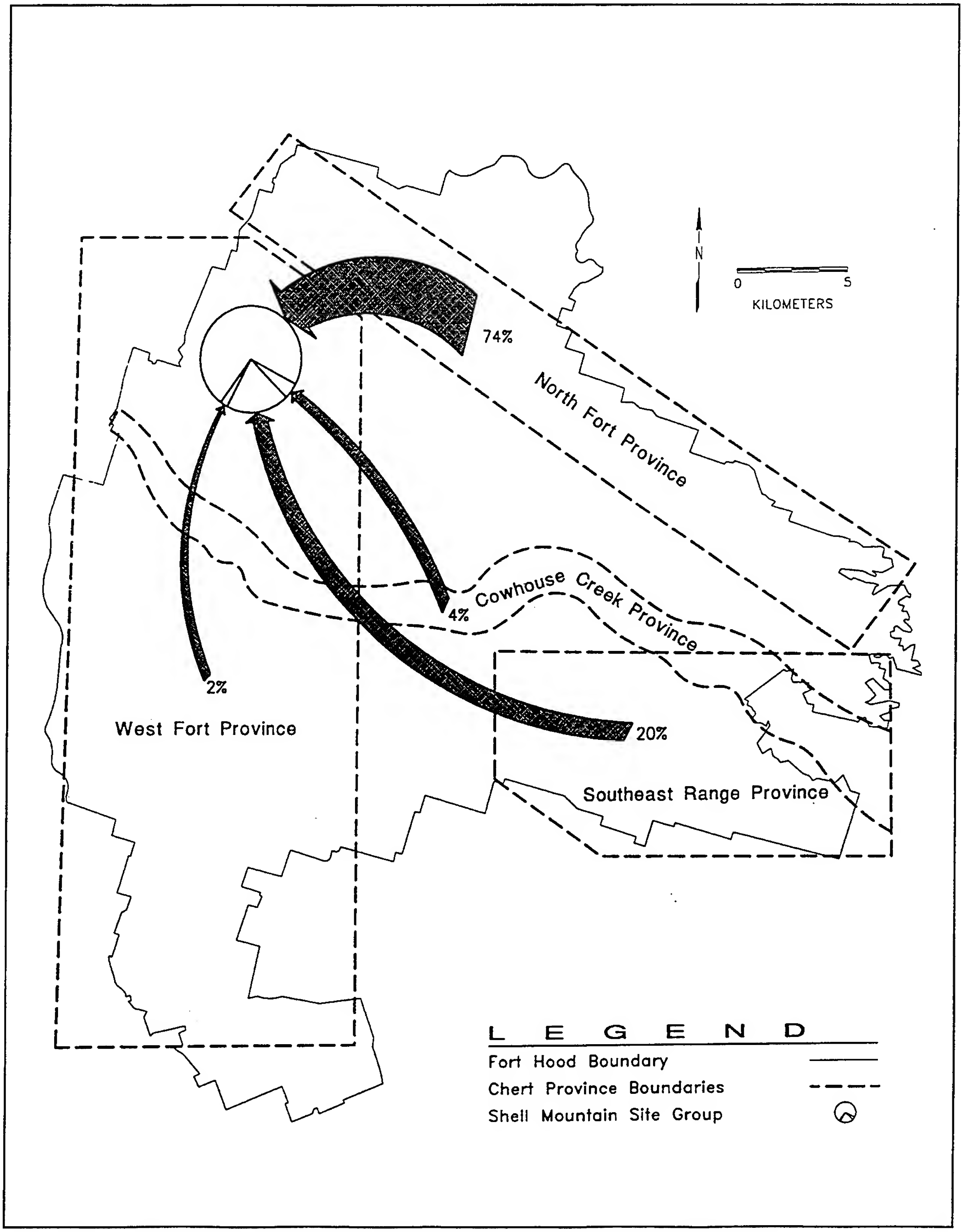


Figure 8.10 West Range Site Groups; Shell Mountain Group Debitage Analysis.

Table 8.8 Shell Mountain Group Chert Types.

Province	Chert Type	41CV1007	41CV1011	41CV1085	41CV1167	41CV137	41CV587	Type Total	% of Identified	% of Total
Southeast Range	1&10-HL Blue	2	11	0	0	1	7	21	0.60%	0.13%
	02-C White	3	16	1	1	5	0	26	0.74%	0.16%
	06-HL Tan	104	111	1	2	325	14	557	15.93%	3.45%
	07-Foss Pale Brown	4	19	0	4	8	8	43	1.23%	0.27%
	13-ER Flecked	17	9	1	0	2	7	36	1.03%	0.22%
	09-HL Tr Brown	2	8	1	1	9	5	26	0.74%	0.16%
	Subtotal							709	20.27%	4.40%
West Fort	03-AM Gray	16	13	1	1	14	11	56	1.60%	0.35%
North Fort	08-FH Yellow	449	53	165	109	1,120	249	2,145	61.34%	13.30%
	14-FH Gray	21	16	0	3	11	11	62	1.77%	0.38%
	15-Gry/Brn/Grn	6	11	4	3	2	16	42	1.20%	0.26%
	16-Leona Park	1	0	0	0	0	0	1	0.03%	0.01%
	17-Owl Crk Black	37	13	0	3	258	11	322	9.21%	2.00%
	Subtotal							2,572	73.55%	15.95%
Cowhouse	18-C Mottled	13	1	4	5	48	1	72	2.06%	0.45%
	19-C Dr Gray	0	2	0	8	22	25	57	1.63%	0.35%
	21-C Lgt Gray	0	0	1	0	0	0	1	0.03%	0.01%
	22-C Mott/Flecks	0	0	0	0	9	0	9	0.26%	0.06%
	23-C Mott/Banded	1	0	0	0	10	1	12	0.34%	0.07%
	27-C Novaculite	0	0	0	1	0	0	1	0.03%	0.01%
	28-Table Rock Flat	0	0	1	0	2	0	3	0.09%	0.02%
	Subtotal							155	4.43%	0.96%
Other	Obsidian	0	0	0	0	1	0	1	0.03%	0.01%
	Quartz	0	0	0	0	0	2	2	0.06%	0.01%
	Quartzite	0	2	0	0	0	0	2	0.06%	0.01%
	Subtotal							5	0.14%	0.03%
Identified Subtotal		676	285	180	141	1,847	368	3,497		
Indeterminate Chert	Indet Black	27	12	0	6	178	18	241		1.49%
	Indet Dk Brown	397	415	17	69	492	218	1,608		9.97%
	Indet Dk Gray	152	198	6	10	331	22	719		4.46%
	Indet Lt Brown	411	1,273	114	386	629	1,638	4,451		27.61%
	Indet Lt Gray	167	180	25	51	337	181	941		5.84%
	Indet Misc.	158	123	105	1	372	3	762		4.73%
	Indet Mottled	22	10	6	0	53	0	91		0.56%
	Indet Trans	10	1	2	0	41	2	56		0.35%
	Indet White	30	61	3	10	89	67	260		1.61%
	Subtotal							9,129		56.62%
Grand Total		2,726	2,843	638	815	6,216	2,885	16,123		

around Shell Mountain, chert debris is moderately common on the upland surface, and it is possible that much of the material represents local material. However, roughly 44% of the cortical assemblage evinces abrasion, suggesting that much of the cortical material was procured from stream bedload.

Surprisingly, given the dominance of North Fort types in the debitage assemblage, the flaked stone tool assemblage is dominated by Southeast Range types (53% of the total), with Heiner Lake Tan alone comprising 48% of the total. North Fort types are still a significant presence at 29% of the total, while Cowhouse materials (15%) are also significant. However, West Fort types occur in low numbers (3%) in the tool assemblage.

8.1.2.5 Turkey Run Group

The Turkey Run group consists of two sites (41CV1391 and 41CV1400), only one of which yielded debitage. Therefore, the trends of debitage occurrence for the group are the same as for 41CV1391, described previously (see section 6.25) (Figure 8.11). Overall, the frequency of identification was very low (7%), limiting the utility of inferences from the identified fraction.

The Southeast Range was represented by Cowhouse White, Heiner Lake Translucent Brown, and Heiner Lake Blue, which collectively comprised 38% of the identified assemblage. West Fort was represented by one type, Anderson Mountain Gray, that also comprised 38% of the identified fraction. North Fort was represented by two types (Fort Hood Yellow and Owl Creek Black) that collectively comprise 25% overall. No definitive Cowhouse province materials were recovered, although it is possible that some or all of the Heiner Lake Translucent Brown actually represent stream procurement from the Cowhouse channel. However, while 18% of the assemblage is cortical, only 13% of those flakes (a total of two flakes) exhibit stream abrasion, suggesting that most of the material was probably procured from upland sources.

No tools were recovered from the Turkey Run assemblage.

8.1.2.6 Summary of Site Group Analysis

General trends in the occurrence of chert materials in the nine site groups suggest some interesting patterns. On the eastern side of the base, the assemblages are overwhelmingly dominated by Southeast Range and North Fort varieties. Moreover, there is a clear trend away from an almost total reliance on Southeast Range cherts in the Southeast Range "core area" (i.e., Nolan/South and Nolan/Cowhouse) toward a mixture of Southeast Range and North Fort varieties in the more northerly sections (Figure 8.12). In contrast, West Fort and Cowhouse materials occur in very low numbers, even in sites immediately adjacent to the Cowhouse channel. Moreover, while this figure assumes that Anderson Mountain Gray is a West Fort type, it is considered more likely that the majority of this material also represents the Southeast Range. Therefore, it appears that people living in the heart of the Southeast Range rarely bothered to look far afield for raw material, while people living within and to the north of the Cowhouse valley exploited both provinces regularly. In all cases, alluvial chert from the Cowhouse channel was a minor component of the lithic assemblage at best (although it is more prevalent in the tool assemblage than in the debitage), although the cortex data suggests that somewhat more alluvial chert might have been procured from the upland tributaries.

On the western side of the base, the picture is somewhat more complicated. Here, the principal identified chert sources lie well to the north-northeast (North Fort) and to the southeast (Southeast Range). Examining the four provinces relative contribution to the debitage from each site group (Figure 8.13) reveals a very slight tendency for the overall contribution Southeast Range to decrease slightly to the north, and a more noticeable tendency for the North Fort contribution to decrease to the south. This appears to represent simple distance-decay, with the contribution of

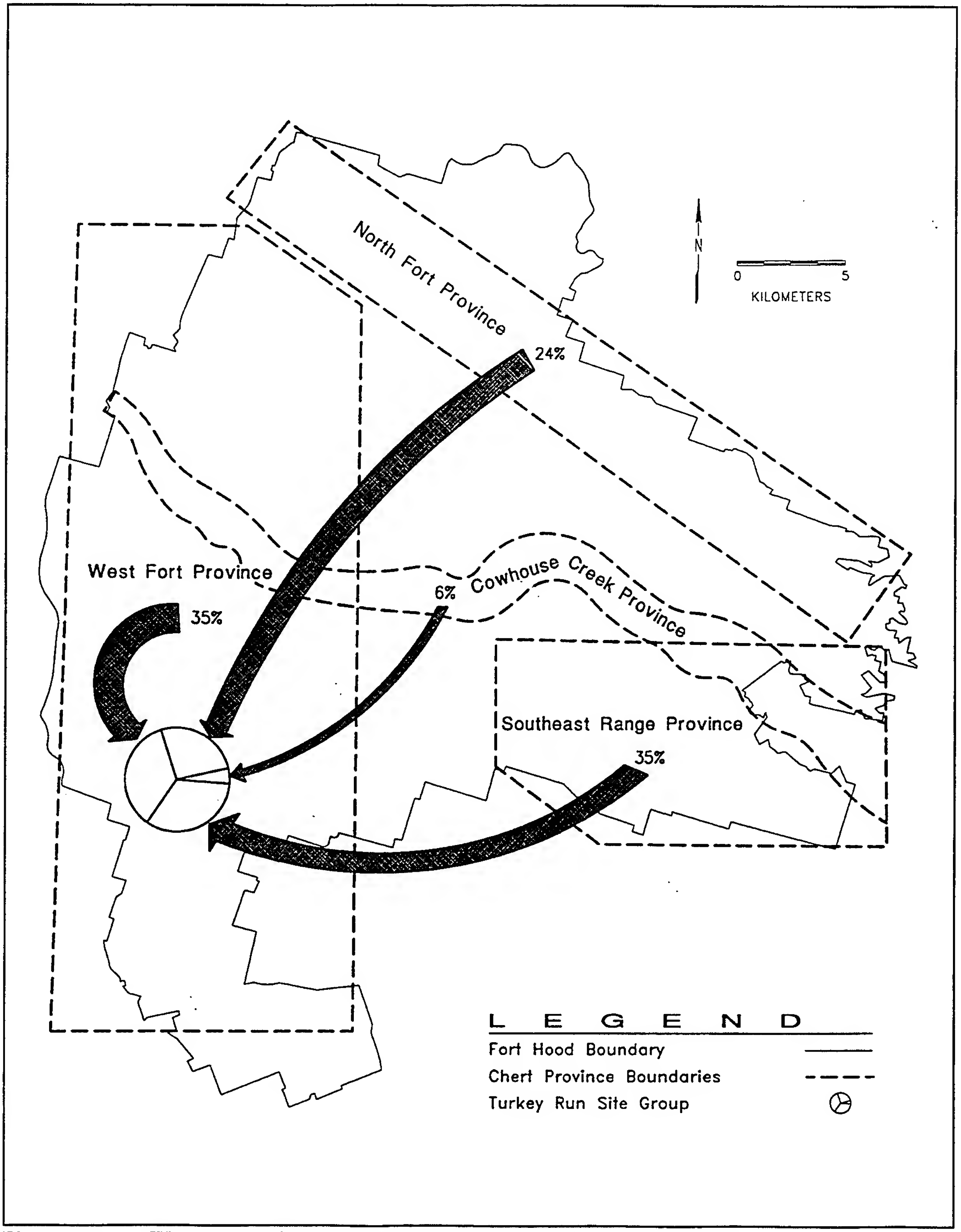


Figure 8.11 West Range Site Groups; Turkey Run Group Debitage Analysis.

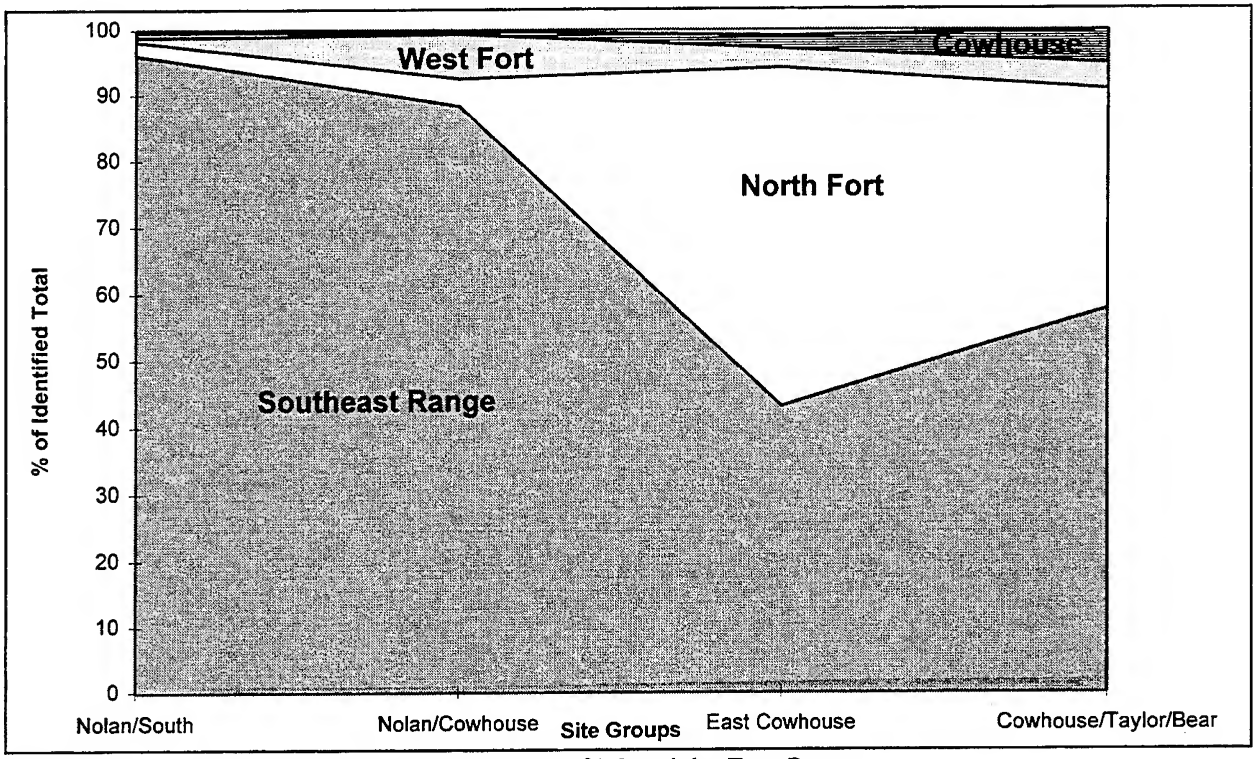


Figure 8.12 General Trends in Occurrence of Materials, East Range.

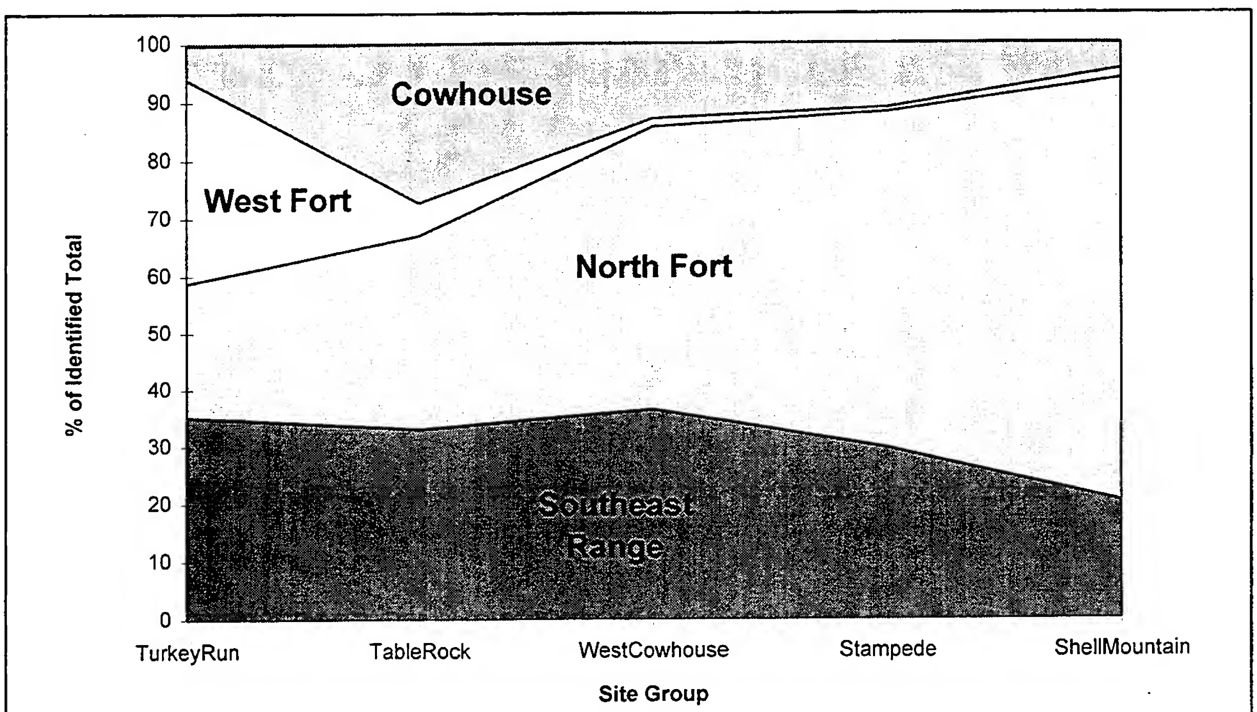


Figure 8.13 General Trends in Occurrence of Materials, West Range.

each source province roughly reflecting its relative distance from the site. The slight increase in Southeast Range cherts in the West Cowhouse group sites is not inconsistent. Although the West Cowhouse centroid is slightly farther north than the Table Rock centroid, it is also farther east, and the average linear distance to the core of the Southeast Range province is approximately 4 km less from the West Cowhouse sites than from the Table Rock sites. More noticeable is the trend in Cowhouse province materials, which are much more important than they are on the eastern side of the base. Surprisingly, the peak in the utilization of Cowhouse cherts is not in the West Cowhouse group, where the source is a few scant meters from each of the sites, but in the Table Rock group to the south and west. The reason for this is unclear, although it may reflect differences in the size and shape of typical procurement catchments between the West Cowhouse sites and the Table Rock sites. Finally, West Fort materials are of very minor importance in all the western site groups except Turkey Run, which sits in a relatively large, chertless expanse and is much closer to the type locality for Anderson Mountain Gray (Anderson Mountain, just north of modern Copperas Cove) than any of the other site groups. However, the Turkey Run distribution is based on a low identification rate from a relatively small, single-site lithic assemblage, and thus should be viewed with caution.

8.1.3 Utilization of Identified Material Types

While examples of all 27 recognized material types were recovered during testing, examination of the recovered assemblage reveals that it is dominated by three types (Heiner Lake Tan, Heiner Lake Translucent Brown, and Fort Hood Yellow) that make up roughly 78% of the identified total (Figure 8.14). Seven additional "secondary" types, each of which comprises from 1% to 6% of the identified total, can also be identified (Cowhouse White, Fossiliferous Pale Brown, Heiner Lake Blue, Anderson Mountain Gray, Fort Hood Gray, Gray/Brown/Green, and Owl Creek Black). The remaining 17 types collectively make up less than 5% of the identified assemblage and represent little more than background noise in the debitage assemblage. While some of this variability could be, and probably is, due to inherent differences "identifiability" arising from the size, character, and spacing of traits diagnostic of the different chert types (and thus represent an artifact of analysis), it is considered extremely unlikely that this could account for the extreme differences apparent in the data. Therefore, the patterns in material occurrence appear to reflect conscious selection by the people using the resource, tempered to some degree by differences in material availability. The following discussion examines each of the important types individually and uses patterns of occurrence in the archeological sample, coupled with characteristics of the material (after Frederick and Ringstaff 1994), to explore some of the less tangible aspects of lithic raw material procurement.

8.1.3.1 Southeast Range Province Cherts

Type 1 and Type 10 - Heiner Lake Blue and Heiner Lake Blue (light)

Heiner Lake Blue (Type 10) and Heiner Lake Blue (light) (Type 1) represent the relatively cryptocrystalline interior and coarser-grained exterior, respectively, of discoid nodules characteristic of the Southeast Range province (Frederick and Ringstaff 1994). The response of unaltered Heiner Lake Blue (light) to early-stage reduction was judged "good," while secondary thinning and pressure flaking was judged "fair." Heiner Lake Blue, in contrast, was judged "poor/fair" in core flake removal and secondary thinning, "fair" in early stage biface production, and "poor" in pressure flaking. While both types were improved by heat treatment, the effect was much more extreme in the darker material, elevating it to a "good" rating in all reduction stages.

Despite differences in character and workability, these two types were treated as a single entity in the preceding discussions because they clearly

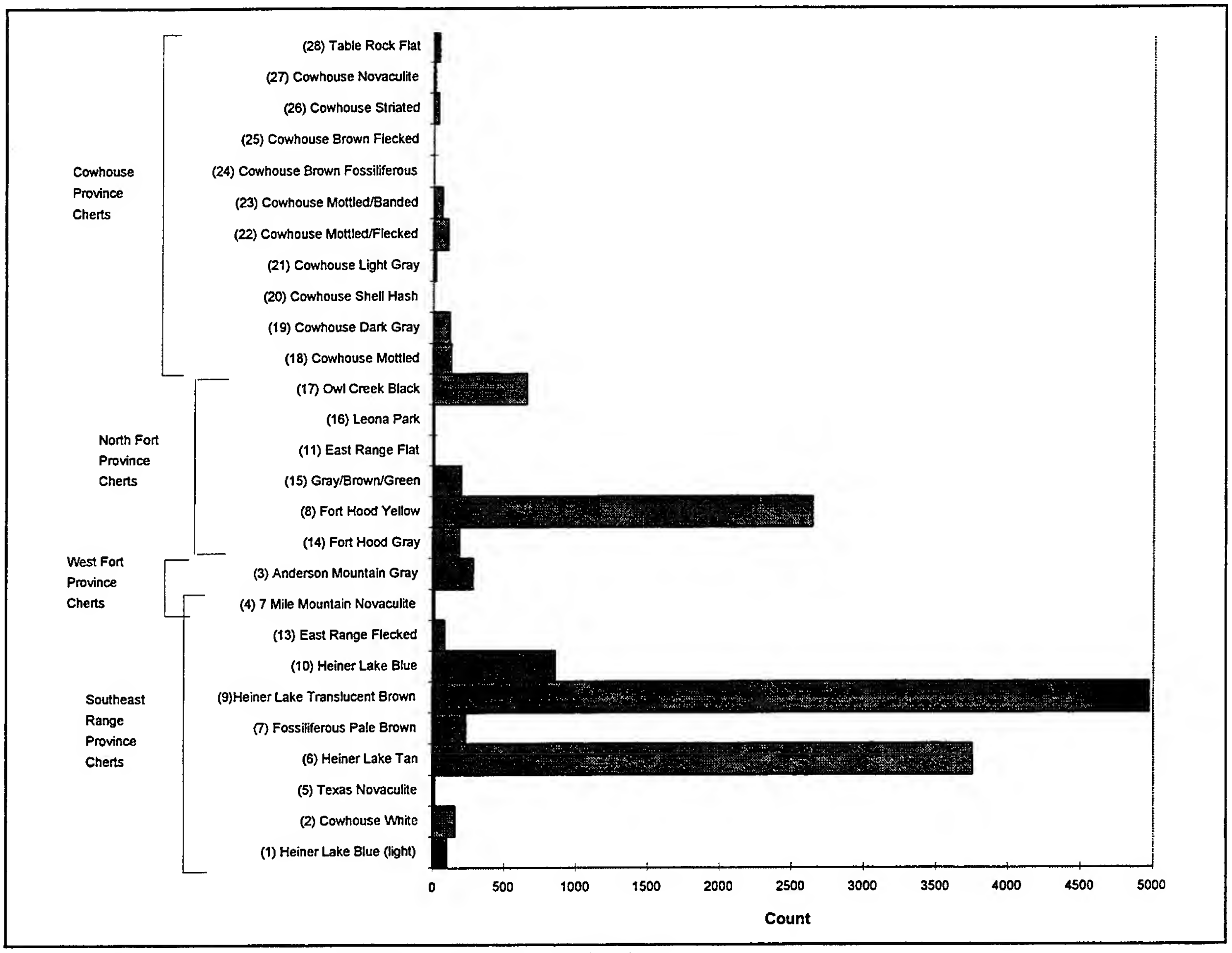


Figure 8.14 Frequency of Material Types Utilized.

represent the same type of procurement behavior when viewed from a spatial perspective. However, at this point, it is instructive to consider the two types separately. Figure 8.15 illustrates the size distribution of Heiner Lake Blue and Heiner Lake Blue (light) flakes recovered from the 57 sites. Interestingly, although the outer material has been judged to be more workable (Frederick and Ringstaff 1994), significantly more of the recovered materials represent the darker material from the center of the nodules. Approximately 15% of the Heiner Lake Blue (light) is cortical, while only 4% of the Heiner Lake Blue has cortex. However, this cortex may often actually represent a rind of the light material rather than a true surface cortex. Moreover, while 62% of the Heiner Lake Blue light (Type 1) is larger than 1.8 cm, 78% of Heiner Lake Blue (Type 10) is smaller than 1.8 cm. Collectively, this suggests that the Heiner Lake Blue (light) flakes represent large, early-stage reduction flakes removed in the process of paring down the nodules to utilize the inner material.

While no projectile points manufactured from either of the Heiner Lake Blue varieties were recovered, this apparent preference for the darker, interior chert is supported by the lithic tool assemblage. Only two tools manufactured from Heiner Lake Blue (light) were recovered: one very large (more than 9 cm), early stage biface, and one moderately large (2.6 to 5.2 cm) uniface. In

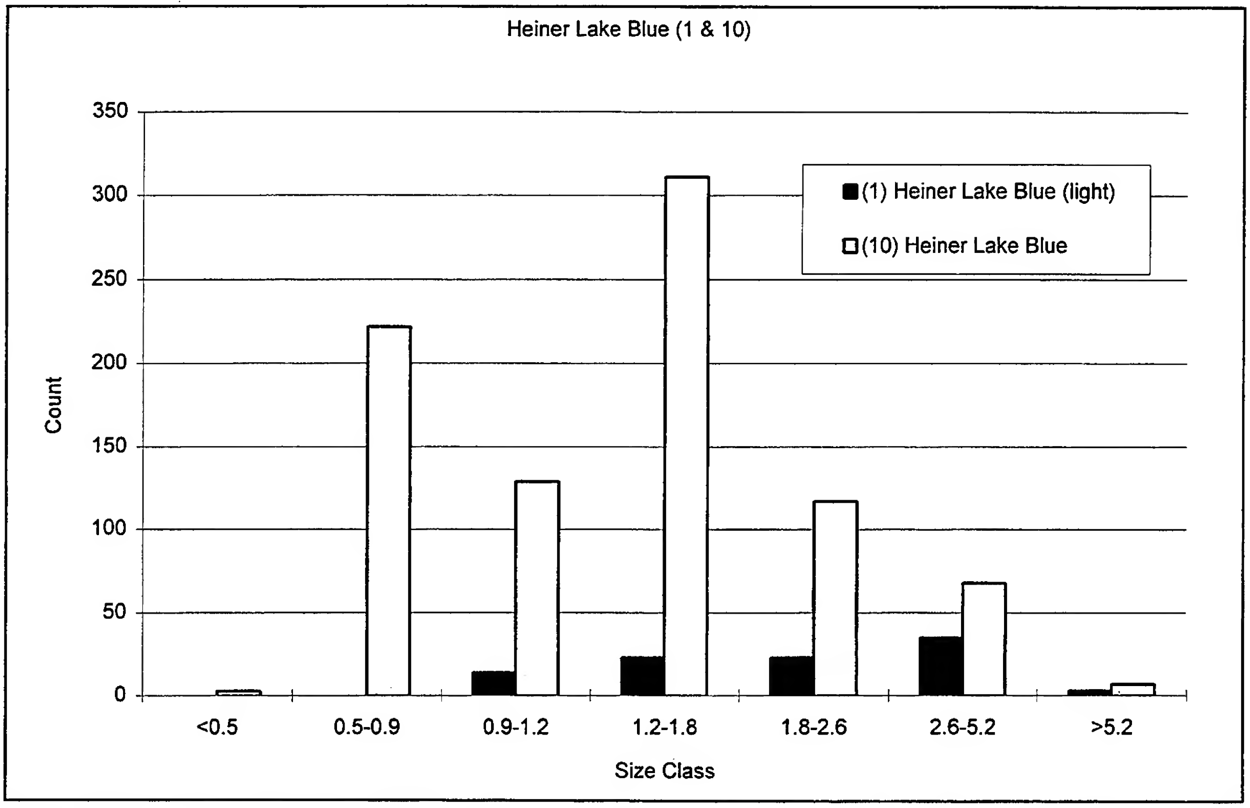


Figure 8.15 Size Distribution of Heiner Lake Blue and Heiner Lake Blue (light) Flakes Recovered.

contrast, 43 different tools in the recovered assemblage are composed of Heiner Lake Blue, including a variety of bifaces, scrapers, gravers, choppers, and utilized flakes indicating that Heiner Lake Blue was the preferred material. One of the difficulties noted in reducing Heiner Lake Blue (Frederick and Ringstaff 1994) was greater than average hardness. While this hardness is a disadvantage in terms of tool manufacture, it is probably a significant advantage in the durability of a finished tool, and may explain the apparent preference for the darker variety.

Both varieties are far more common on the eastern side of the base, and particularly in the heart of the Southeast Range province (i.e., Nolan/South). However, appreciable numbers of Heiner Lake Blue were also recovered from the West Cowhouse and Shell Mountain site groups, indicating that it was occasionally transported considerable distances after procurement.

Type 2 - Cowhouse White

Cowhouse White consists of a light gray to bluish white banded chert that occurs in the northeastern part of the Southeast Range province, overlooking the Cowhouse Creek valley and Lake Belton from the north. The material varies from very fine to relatively coarse-grained, and was judged to have "good" workability in an unaltered state for all reduction stages except pressure flaking, which was rated as "fair." However, even low-level heat treatment was able to improve this rating to "good" without adversely affecting the earlier reduction stages.

Despite its relatively good workability, Cowhouse White occurs at only a background level in the recovered assemblage (1.05% of the identified fraction). Roughly 64% of the assemblage is between 1.2 and 2.6 cm in size, which suggests primarily intermediate stage reduction (e.g., biface

refinement and initial thinning) (Figure 8.16). At least some early-stage reduction is indicated by the 15% of Cowhouse White flakes that have cortex. No projectile points manufactured from Cowhouse White were recovered; however, 14 tools representing a variety of formal (e.g., adze, late stage biface, side scraper) and informal (e.g., utilized and edge-modified flakes) were recovered. This represents 1.9% of the tools made from identified materials, and thus is roughly in line with the percentage of Cowhouse White in the debitage assemblage.

Although the known Cowhouse White outcrop is situated closest to the East Cowhouse and Cowhouse/Taylor/Bear groups, little of the material (approximately 5% and 1% of the Cowhouse White total, respectively) was recovered from these contexts. Rather, the majority (65%) was recovered from the heart of the Southeast Range (i.e., Nolan/South and Nolan/Cowhouse) across the Cowhouse from the known outcrop, and another 28% was recovered from the sites on the western side of the base, where it occurred in all but the Table Rock Group.

Type 6 - Heiner Lake Tan

Heiner Lake Tan consists of medium to fine, light gray, light brownish gray, grayish orange, or white chert. Relatively subtle round, white mottles are common. Unaltered, it was judged to have "good" workability in core-flake and early-stage biface production, and "fair" workability in secondary thinning and pressure flaking. Medium to high heat treatment improved this material to "good" in all reduction stages.

Heiner Lake Tan is the second most common type in the identified debitage assemblage, representing almost 26% of the total. The majority of the material (80%) is in the size ranges indicative of latter-stage reduction (generally <1.8 cm), with a modal peak in the 0.5 to 0.9 cm class (Figure 8.17). Only slightly more than 8% of the assemblage is cortical, which supports this interpretation.

The representation of Heiner Lake Tan in the lithic tools and points is even more overwhelming than it is in the debitage assemblage. Almost half of the projectile points manufactured from an identified chert type are composed of Heiner Lake Tan. These sixty points range from Early Archaic (e.g., Andice, Wilson) to Late Prehistoric (e.g., Perdiz, Scallorn) in age, demonstrating that Heiner Lake Tan utilization was not a short-lived phenomenon. A bewildering variety of tools (n=268; 38%) is also composed of the material. Essentially all of the identified flaked stone tool types (n=19) are represented by at least one implement, although the majority either represents bifaces in various stages of production or expedient tools (e.g., utilized flakes, edge-modified flakes, and unifaces).

The geographic distribution of Heiner Lake Tan is also remarkable. With the exception of the small Turkey Run assemblage, Heiner Lake Tan comprises between 16% and 32% of each of the site group assemblages. While it does show distance decay away from the source (the highest ratio is Nolan/South, in the heart of the Southeast Range source, while the lowest is Shell Mountain, which at better than 25 km, is the most distant group relative to the source) the sustained importance of the material is remarkable, particularly in contrast to Heiner Lake Translucent Brown (see below).

Type 7 - Fossiliferous Pale Brown

This material consists of pale brownish, yellowish, or grayish, medium- to fine-grained chert containing common fine, whitish fossil inclusions and occasional larger fossils and veins replaced by chalcedony or quartz. The workability of the material has not been investigated, but the presence of fossil inclusions and quartz and chalcedony veins suggest that it is probably typically too heterogeneous to be highly workable.

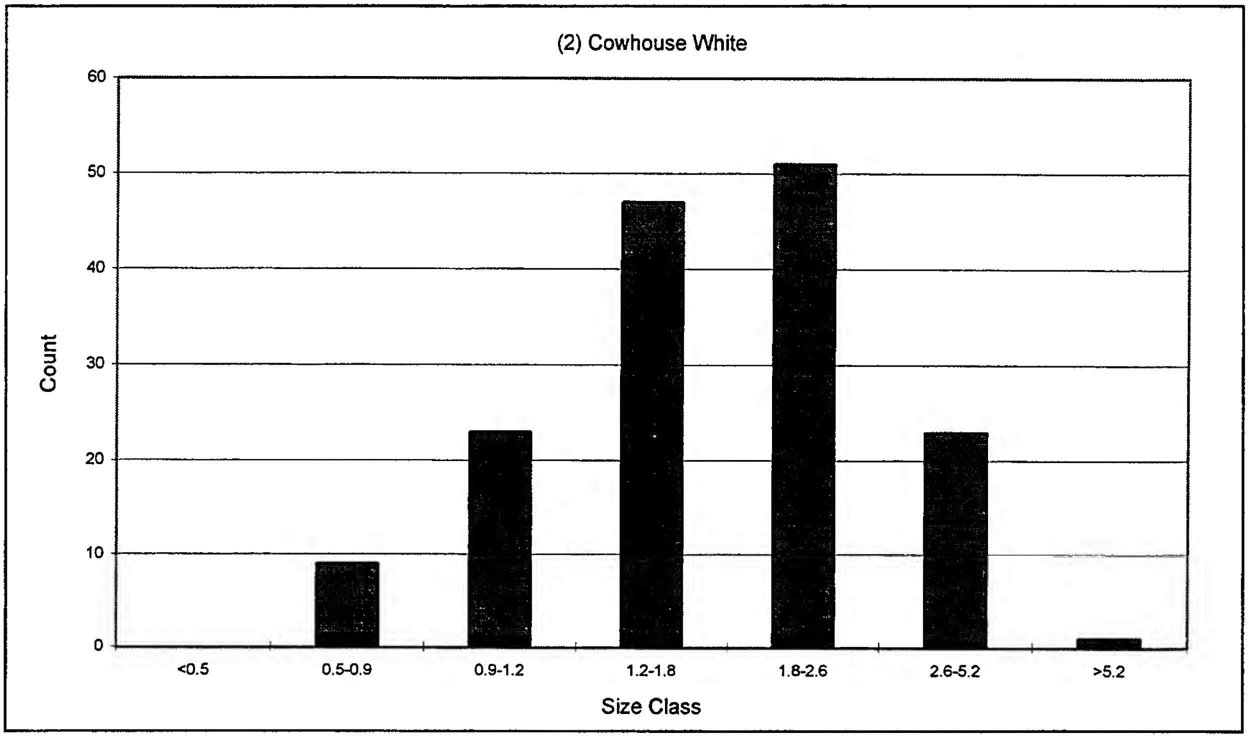


Figure 8.16 Size Distribution of Cowhouse White.

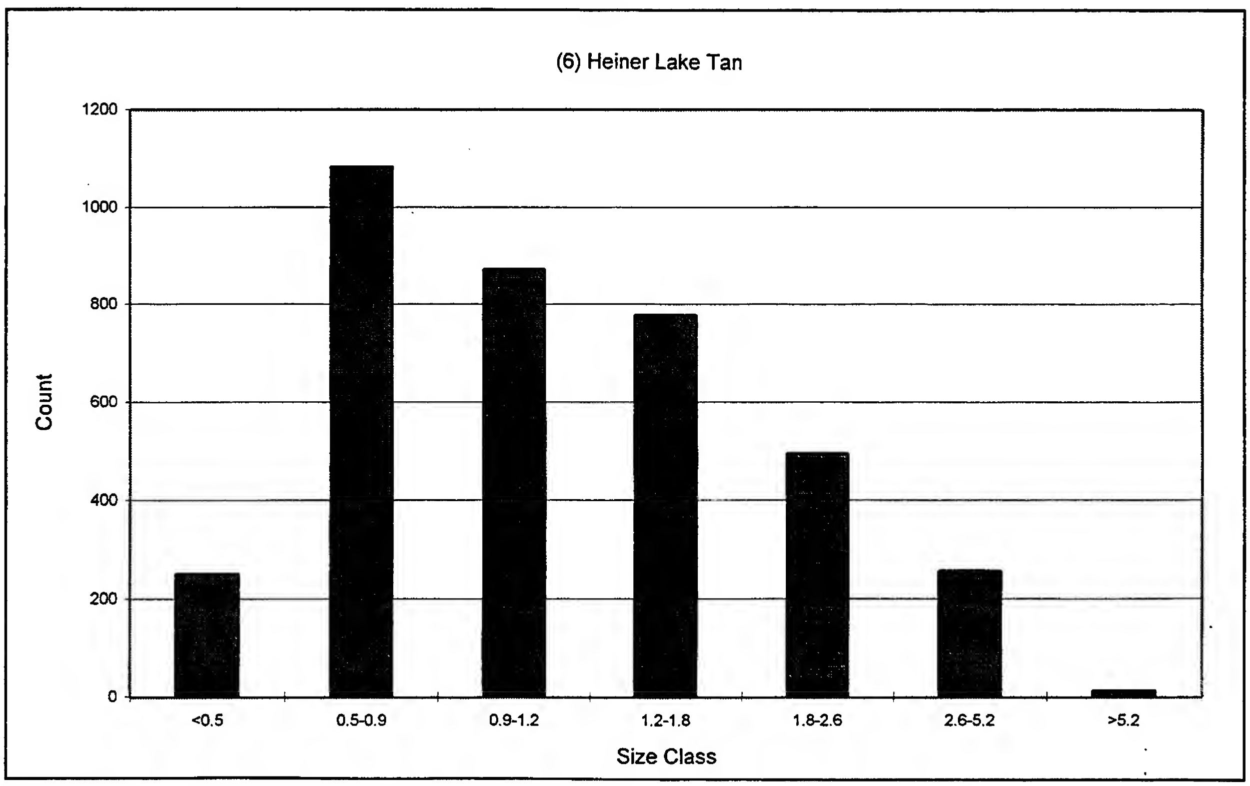


Figure 8.17 Size Distribution of Heiner Lake Tan.

Approximately 1.5% of the identified assemblage is composed of Fossiliferous Pale Brown. The assemblage is dominated by flakes in the larger size categories, and exhibits a modal peak in the 2.6 to 5.2 size class (Figure 8.18). Almost 46% of the assemblage is cortical, suggesting that the material was not strongly reduced. No projectile points of the material were recovered. The few tools recovered tended to be relatively informal (edge-modified flakes, utilized flakes, and unifaces). Although one chopper and one end scraper were recovered, no other bifacial tools were composed of the material.

Despite the low frequency, Fossiliferous Pale Brown occurs in every site grouping except Turkey Run. Although the majority of the material is clearly associated with the Southeast Range province, significant fractions were also recovered from Shell Mountain and West Cowhouse.

Type 9 - Heiner Lake Translucent Brown

Heiner Lake Translucent Brown occurs in relatively small blocky to tabular nodules and varies from dark brown to dark grayish brown to light yellowish brown in color. It is moderately to strongly translucent, striated, and contains whitish to yellowish fine opaque mottles. Typically, the nodules are cut by interior fractures and cleavage planes. It was judged to have "poor" workability in the initial removal of core flakes due to the presence of these cleavage planes, while early-stage biface production, secondary thinning, and pressure flaking all were rated as "fair." All stages were noted to improve with heating.

Heiner Lake Translucent Brown comprises almost 34% of the identified assemblage. The assemblage is dominated by materials in the medium to small size grades, with a modal peak in the 0.5 to 0.9 cm range (Figure 8.19). Only slightly more than 6% of the recovered flakes evince cortical surfaces, suggesting that the majority of the material was decortified elsewhere. Despite its preeminent place in the debitage assemblage, Heiner Lake Translucent Brown is distinctly secondary to Heiner Lake Tan in the recovered tools and projectile points. Only nine Heiner Lake Translucent Brown projectile points, ranging in age from Paleoindian to Late/Transitional Archaic, were recovered from the 57 sites (cf. 60 Heiner Lake Tan specimens). While the tool sample was almost as diverse as the Heiner Lake Tan sample (121 tools representing 15 different types), the total count of Heiner Lake Translucent Brown tools was less than half of the Heiner Lake Tan assemblage.

Therefore, the high frequency of Heiner Lake Translucent Brown debitage seems somewhat anomalous. Use of the material is not particularly surprising, because once the material has been decorticated and fractured along flawed cleavage planes, it is highly workable (Frederick and Ringstaff 1994). However, it is clearly inferior to some of the other types that it numerically overpowers (e.g., Fort Hood Gray, Gray/Brown/Green). There is no ready explanation for its preference over other equally suitable materials.

Equally interesting, a comparison with the other dominant Southeast Range variety, Heiner Lake Tan, reveals that while the translucent brown material is dominant in the source province (Southeast Range), it has a much greater rate of distance decay than the latter material. While roughly 74% of the entire Heiner Lake Tan assemblage is associated with the Southeast Range "core" (i.e., Nolan/South and Nolan/Cowhouse), almost 96% of the Heiner Lake Translucent Brown assemblage is associated with this same core area. As a result, the frequency of Heiner Lake Translucent Brown only exceeds that of Heiner Lake Tan in two of the site groups: Turkey Run, where the overall frequency is so low that its representative character is questionable, and Nolan/South, which is coincident with the source of both types. Moreover, to the extent that the relatively meager assemblage of Heiner Lake Translucent Brown in the sites on the western side of the fort actually represent material procured from the Cowhouse channel, this percentage is increased. Therefore, Heiner Lake Translucent

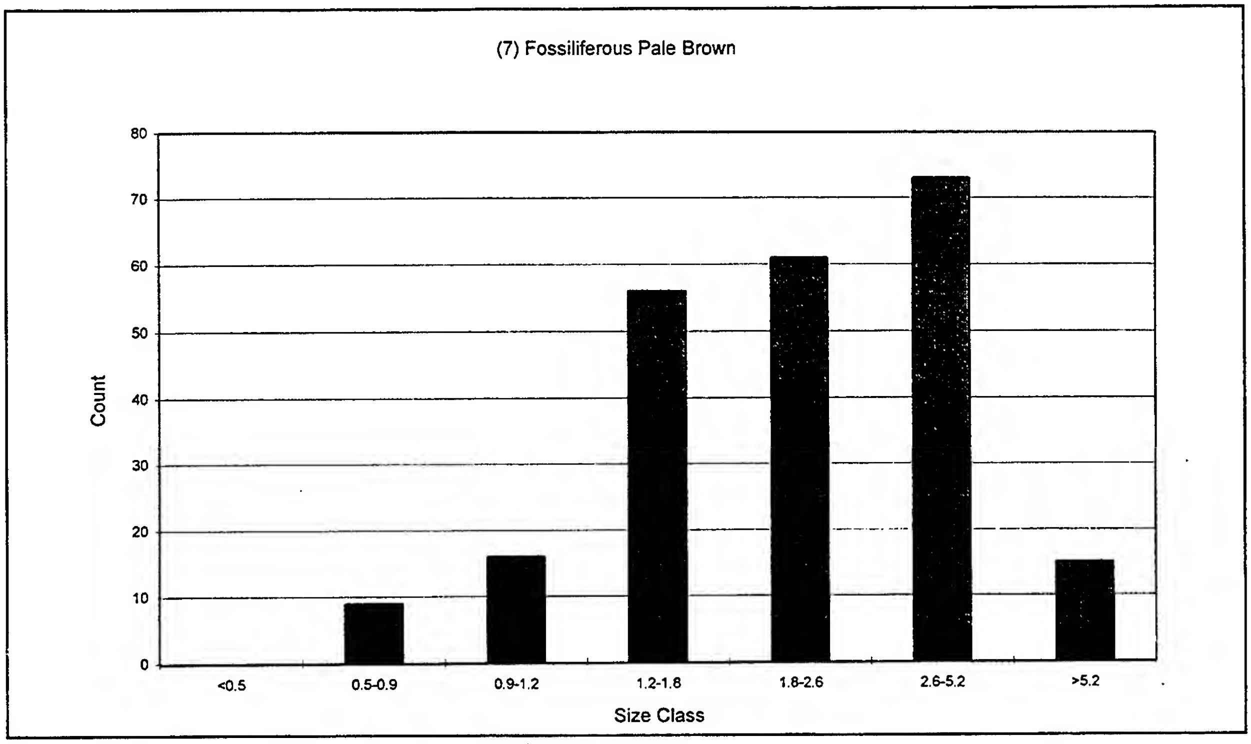


Figure 8.18 Size Distribution of Fossiliferous Pale Brown.

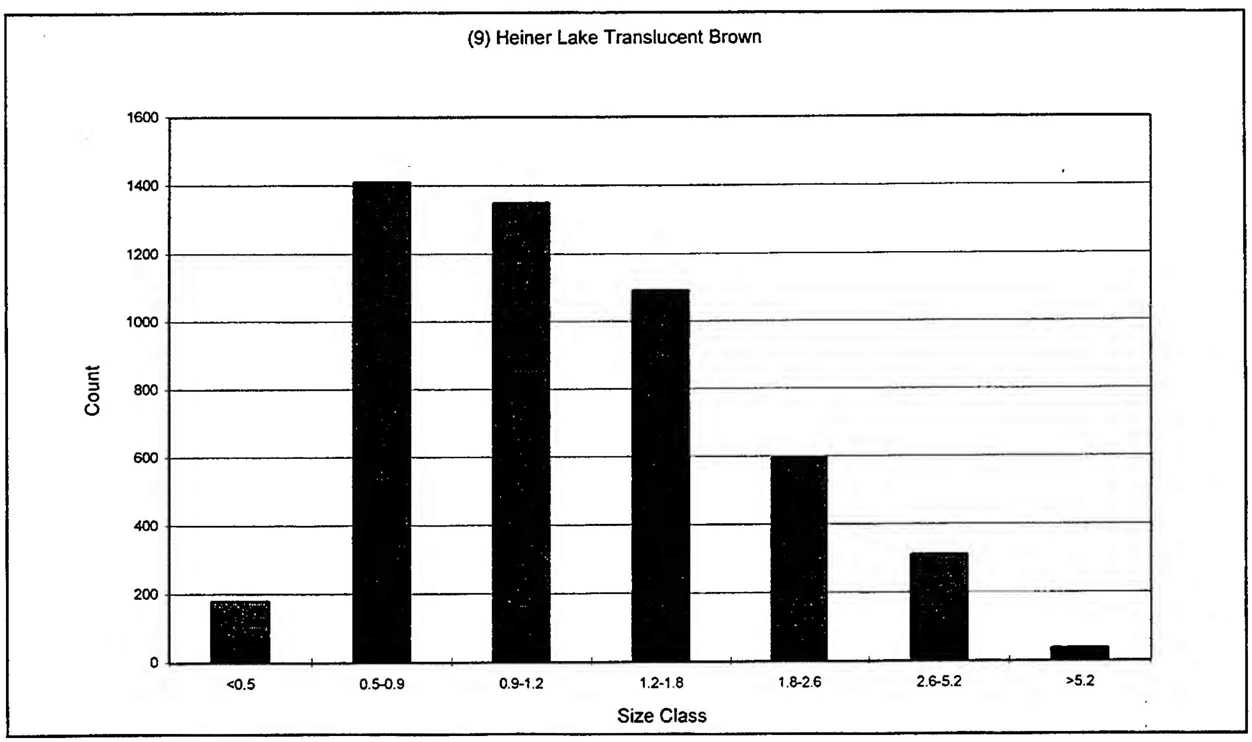


Figure 8.19 Size Distribution of Heiner Lake Translucent Brown.

Brown appears to have a drastically sharper rate of distance decay, and only appears to be an attractive material close to the bedrock source. The most likely reason for this difference lies in the character of the nodules. While Heiner Lake Tan occurs in large (often more than 1 m), discoid nodules that can yield substantial cores, the translucent material occurs in relatively small, fracture-ridden nodules that only yields small blanks. Thus, Heiner Lake Tan is amenable to efficient reduction and subsequent long-distance transportation of versatile raw material blanks, while Heiner Lake Translucent Brown is not.

Type 13 - East Range Flecked

East Range Flecked consists of medium to fine-textured, dark to light gray chert containing abundant small white flecks. It occurs in thin, fractured nodules known from a relatively restricted outcrop in the northern part of the Southeast Range province. It was judged "fair/good" in core flake and early stage biface production, "fair" in secondary thinning, and "fair/poor" in pressure flaking. All stages were improved by heat treatment.

The material was recovered in very low frequencies from the 57 sites (approximately 0.5% of the identified total). The material was concentrated in the intermediate-size categories, with a modal peak in the 0.9 to 1.2 cm class (Figure 8.20). Roughly 10% of the assemblage was composed of cortical flakes. Surprisingly, given the low debitage return, two of the recovered projectile points (a Castroville and a Scallorn) were made from the material, as were six different tools, including four preforms, a late-stage biface, and a side scraper. Slightly over half of the material was recovered from the Southeast Range "core," but the single highest return was from the distant Shell Mountain group. This may indicate that an alternate source of the material is present somewhere in the northwestern part of the fort or in the live fire area.

8.1.3.2 North Fort Province Cherts

Type 5 - Texas Novaculite

Texas Novaculite consists of coarsely mottled, somewhat translucent chert with a pale bluish gray, white, or pale yellowish brown color and a medium to fine texture. It is extremely hard to flake in an unaltered state, but improves dramatically with intense heat treatment. Only one restricted outcrop of this material is known, suggesting prehistoric availability may have been limited. Unaltered, it was judged "poor/fair" in initial core flake production, "fair" in early stage biface reduction, and "fair/poor" in secondary thinning and pressure flaking. However, high heating was able to substantially alter the material, improving it to a "good" rating in all reduction categories.

Very little Texas Novaculite was recovered from the 57 sites. No tools or points were recovered, and the debitage recovery consisted of only 12 flakes (seven of which were cortical). However, this sparse sample was drawn from three widely dispersed site groups (Nolan/South, Cowhouse/Taylor/Bear, and West Cowhouse), suggesting that it was a widely, albeit sporadically, exploited resource.

Type 8 - Fort Hood Yellow

This material consists of fine-grained, very pale brown to yellow opaque chert with occasional to common medium-textured, light gray mottles. It occurs in relatively large, irregular nodules that commonly contain vughs and are relatively widespread in the North Fort province. It is rated as a "good" material for all stages of reduction in both its unaltered state and after heat treatment.

Fort Hood Yellow is the third most commonly recovered material from the 57 sites. Like the other high recovery cherts, the majority of flakes were concentrated in the smaller size categories (Figure 8.21). This, coupled with the fact that less than 7% of the flakes were cortical, suggests that

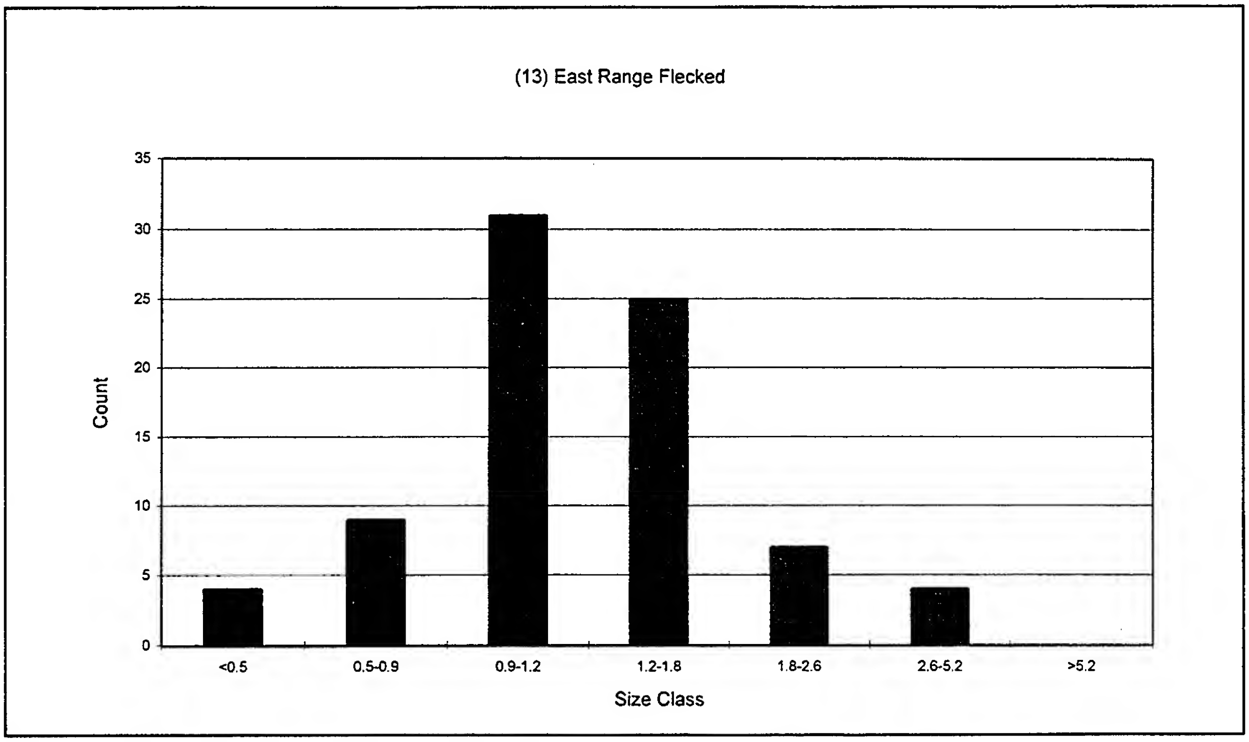


Figure 8.20 Size Distribution of East Range Flecked.

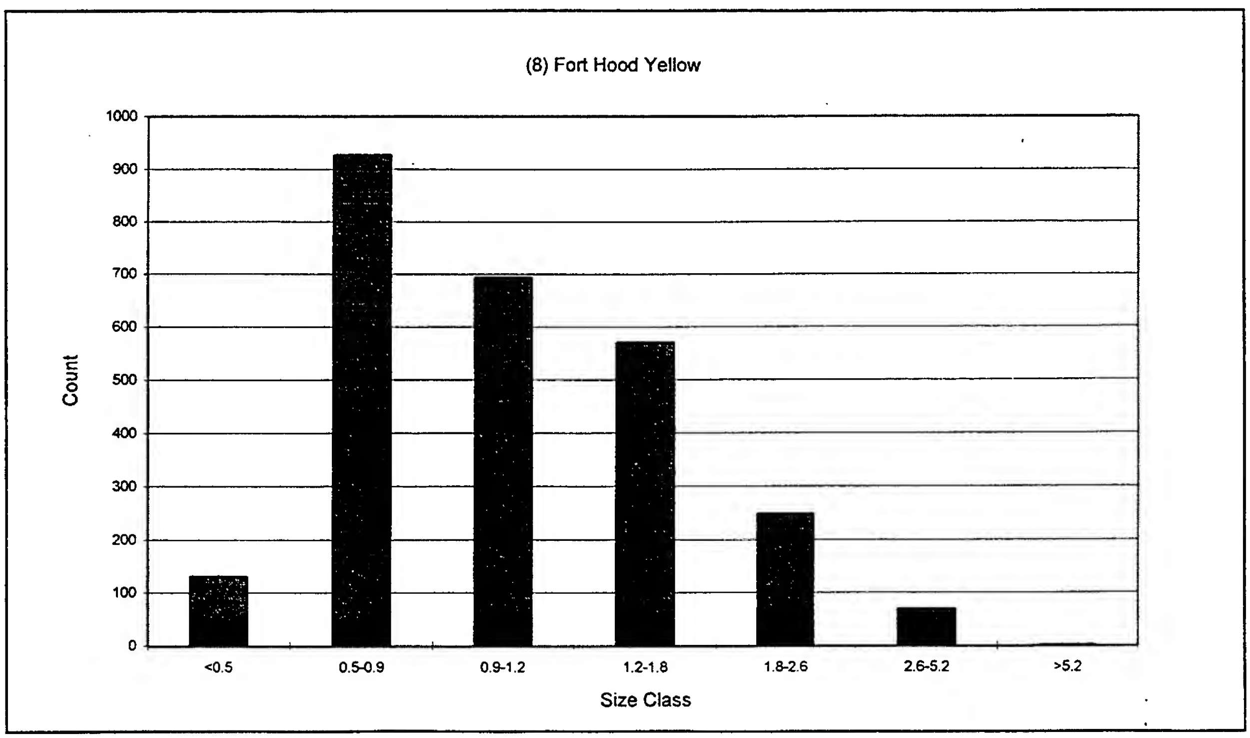


Figure 8.21 Size Distribution of Fort Hood Yellow.

most early stage reduction was probably performed elsewhere.

Eighteen of the recovered projectile points (15% of the total), ranging in affiliation from Middle Archaic through Late Prehistoric, were manufactured from the material. A variety of tools, including scrapers, bifaces, and utilized flakes, were also recovered. This assemblage represents less than 7% of the tools manufactured from identified materials, which is somewhat surprising given that the material comprises over 18% of the identified debitage and 15% of the projectile points. This relatively low utilization for tool manufacture is reflected in the range of tools represented; unlike Heiner Lake Tan, only slightly more than half of the flaked stone tool types had examples constructed from Fort Hood Yellow.

Although the material was represented in every site group, the overwhelming majority (81%) was recovered from the Shell Mountain sites. Here it comprised an impressive 61% of the overall assemblage. Other areas where it formed a significant fraction of the assemblage include the West Cowhouse (26%), Table Rock (18%), Stampede (41%), and Cowhouse/Taylor/Bear (10%) site groups.

Type 11 - East Range Flat

This material consists of mottled, medium-textured, light gray to olive gray chert that often contains internal voids and chalky inclusions. It is dull in appearance, somewhat chalky in texture, and is known to occur as irregularly shaped nodules in tributary canyons south of Owl Creek. It was rated as "fair" in all stages of lithic reduction except initial biface reduction, where it was judged "fair/good." Medium to high heat treatment improved all types of reduction to the "good" rating.

East Range Flat comprised a scant 0.04% of the assemblage, and was therefore clearly not a significant raw material in the sites examined. These few flakes were evenly split between the Southeast Range "core" and the West Cowhouse province, both of which are relatively distant from the known source.

Type 14 - Fort Hood Gray

This material consists of a fine-grained, slightly lustrous chert that ranges from a medium gray through dark gray and into a bluish gray. It is commonly mottled, slightly translucent to opaque, and slightly lustrous. Chalky voids and inclusions are occasionally present. It is known to crop out as irregular nodules that grade into Gray/Brown/Green, which it stratigraphically overlies. It was judged uniformly "good" in all stages of reduction, with and without heat treatment.

Despite its relatively high quality, Fort Hood Gray debitage was recovered in relatively low frequency (approximately 1.2% of the identified total). However, better than 22% of this material was cortical. Like most of the other low frequency materials, the identified flakes tended to be fairly large (Figure 8.22). Despite its low frequency, the material was recovered from every site group except Turkey Run, with the highest percentage coming from the Shell Mountain (34%) and West Cowhouse (32%) sites. It also comprised a disproportionately high percentage of the tools (3%) and projectile points (4%) made from identified types relative to the debitage, suggesting that at least some of the debitage was probably misidentified as indeterminate dark gray.

Type 15 - Gray/Brown/Green

This chert also occurs as irregularly shaped nodules that stratigraphically underlies the Fort Hood Gray beds. It ranges in color from light brownish gray through olive gray to very dark gray in color and exhibits distinct mottling. It is opaque, slightly lustrous, and was judged a "good" material for all stages of reduction in both unaltered and heat-treated states.

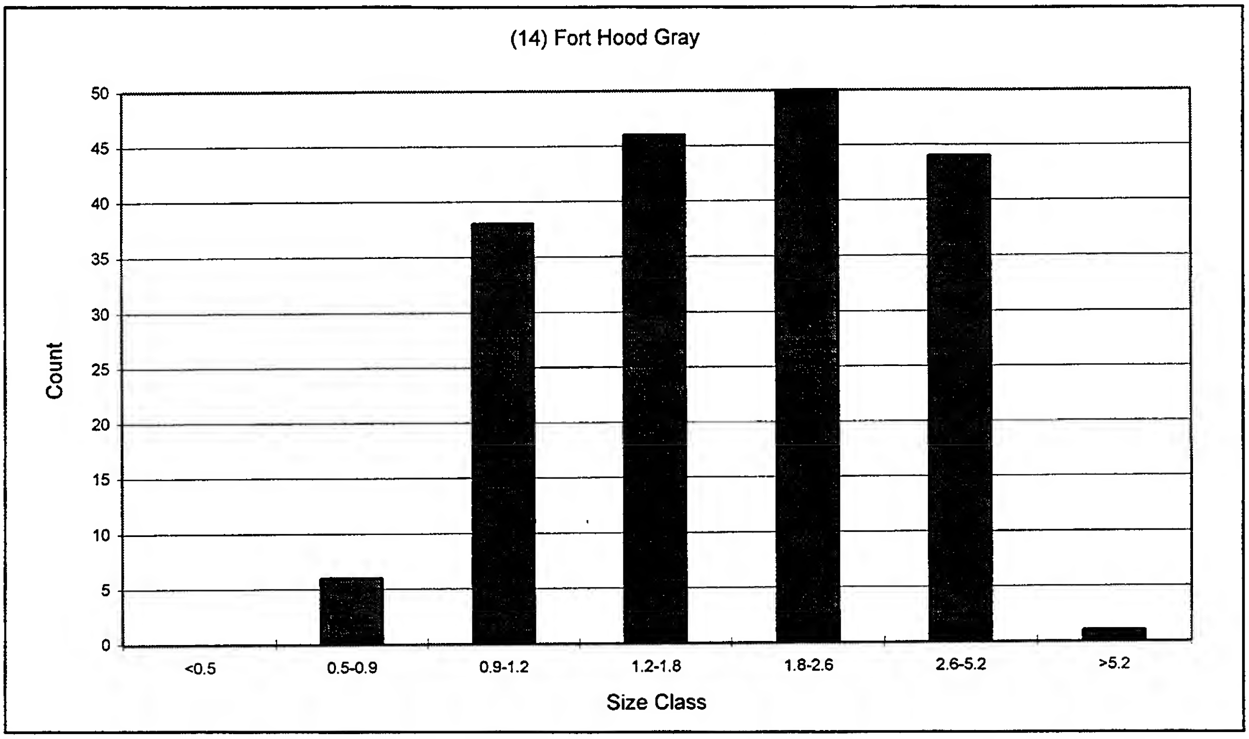


Figure 8.22 Size Distribution of Fort Hood Gray.

Gray/Brown/Green in the recovered sample followed a pattern similar to Fort Hood Gray; it comprised only 1.3% of the identified debitage but better than 9% of the projectile points and 4% of the tools. Like Fort Hood Gray, the majority of identified Gray/Brown/Green flakes were relatively large (Figure 8.23) and over 20% were cortical. Also, like Fort Hood Gray, it occurred in all site groups except Turkey Run, but was most common in the Shell Mountain and West Cowhouse groups. Collectively, this suggests that at least some of the Gray/Brown/Green flakes were incorrectly classified.

Type 16 - Leona Park

This material consists of mottled dark gray to light gray tabular bedded chert that exhibits a pronounced horizontal fabric. Beds often exceed 50 cm in thickness. It is opaque and emits a strong petroleum odor after heating. Leona Park has not been observed within the Fort Hood boundary, but is known from immediately northeast of the Fort. Core flake production was judged "good," but initial biface reduction was judged to be only "fair," and secondary thinning and pressure flaking were judged "fair/poor." Leona Park comprises less than 0.04% of the assemblage, and thus represents only background noise.

Type 17 - Owl Creek Black

This material consists of dark gray to black opaque chert with a fine-grained to aphanitic texture, a moderate to strong luster, and a commonly speckled appearance. It has not been observed to outcrop on the base, but does occur to the northeast in the form of thin tabular nodules and is believed to also occur in the live fire area on the basis of observed alluvial clasts (Frederick and Ringstaff 1994:154). Like Fort Hood Yellow, Fort Hood Gray, and Gray/Brown/Green, Owl Creek Black was judged a "good" material for all stages of reduction in both the raw state and after heat treatment.

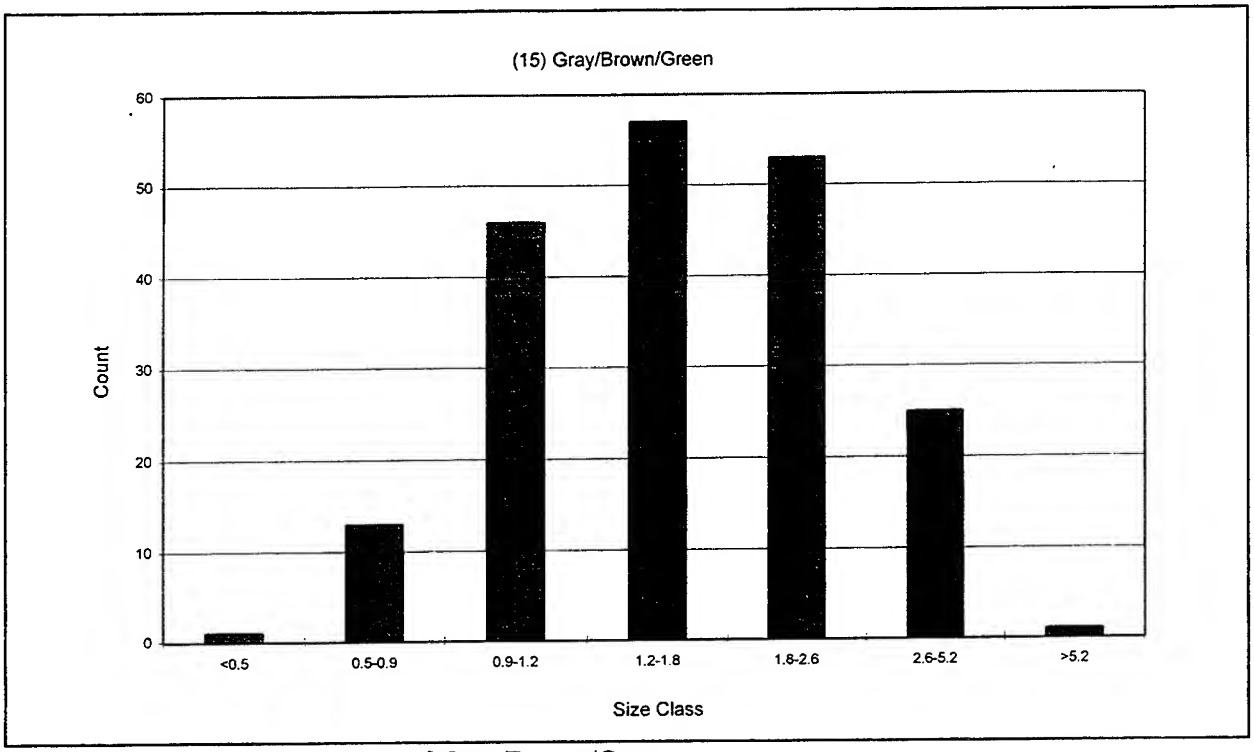


Figure 8.23 Size Distribution of Gray/Brown/Green.

Owl Creek Black was recovered in modest, yet significant frequency (roughly 4.5% of the recovered assemblage). Interestingly, the size distribution of Owl Creek Black precisely mirrors the Fort Hood Yellow distribution, peaking in the relatively small ranges (Figure 8.24). This, coupled with the fact that both materials show similar distribution trends (peaking in the Shell Mountain and West Cowhouse provinces), suggests that Owl Creek Black and Fort Hood Yellow were procured and utilized in a similar manner.

Roughly 3% of the tools and 9% of the projectile points made from identified materials were composed of Owl Creek Black. The projectile points range from Middle to Late Archaic in affiliation. The tools include a mixture of relatively unrefined, expedient specimens (e.g., edge-modified flakes and utilized flakes) and well-formed formal tools (e.g., spokeshaves, refined bifaces).

Collectively, the data suggests that Owl Creek Black was a fairly desirable material, perhaps for both practical (it is highly workable) and more intangible (it is an attractive material that results in rather striking artifacts) reasons. For the same reason, it is unlikely that much of it went unidentified during analysis. However, previous investigations suggest that Owl Creek Black is not as pervasive on the landscape as Fort Hood Yellow. This limited availability, rather than any behavioral process, is probably the principal reason that Owl Creek Black is a "second tier" chert in the overall assemblage.

8.1.3.3 West Fort Province Cherts

Type 3 - Anderson Mountain Gray

This chert is associated with Anderson Mountain in the southwestern part of the base near the modern city of Copperas Cove. It consists of fossiliferous, opaque, medium to fine-grained chert with a mottled appearance, and occurs in disc-shaped

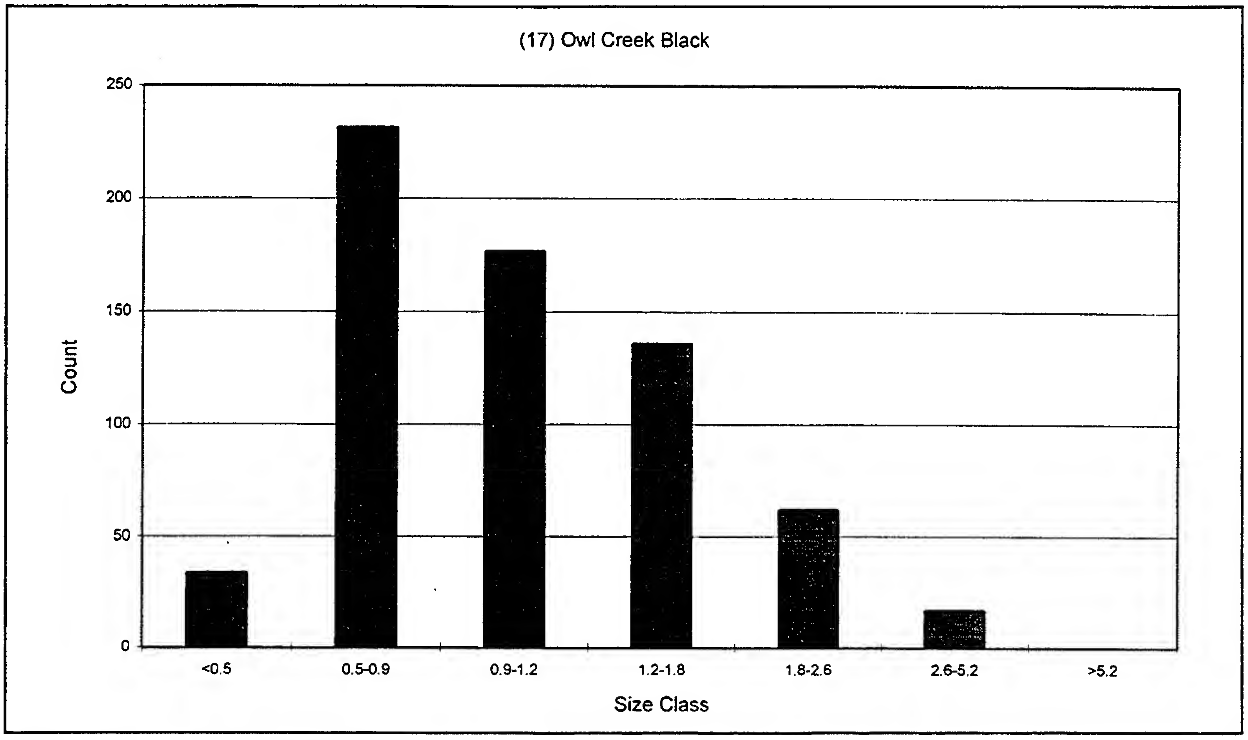


Figure 8.24 Size Distribution of Owl Creek Black.

nodules of medium size. Color ranges from white, pale yellowish brown, and light gray in the outer nodule to medium dark gray, olive gray, and brownish gray in the center. It was judged "fair" in initial core flake production, "good" in initial biface reduction, "fair" in secondary thinning, and "fair/poor" in pressure flaking.

Anderson Mountain Gray comprises less than 2% of the overall debitage assemblage. The size distribution peaks in the intermediate size grades (Figure 8.25), and roughly 14% of the assemblage is cortical. As detailed previously, a similar, undescribed material has been observed in the Southeast Range province. Almost 63% of the Anderson Mountain Gray debitage was recovered from the Nolan/South and Nolan/Cowhouse groups, and is believed to represent a source in the eastern part of the base. An additional 36% of the material was recovered from the Shell Mountain group, and probably represents procurement from the West Fort province. It also forms an important component in the very small assemblage from the Turkey Run group, which is situated closest to the known source (Anderson Mountain). In the remainder of site groups, it represents little more than background noise.

Type 4 - Seven Mile Mountain Novaculite

This extremely hard material occurs in various forms ranging from small (baseball-sized), rounded nodules to large (1+ m), irregular blocks on the Manning surfaces, particularly in the southwestern part of the base, around Seven Mile Mountain. It consists of a cloudy translucent material that ranges from light gray and light bluish gray to pale blue, and frequently contains vughs filled with megaquartz. It ranges from very coarse-grained to medium-grained, with the highest quality material typically in an intermediate zone between a coarse outer rind and a coarse-grained core. Bluish and orangish veins are common in the relatively fine-grained material. The outer cortex is very unusual, consisting of a very porous, rough surface with a frequently pronounced vesicular to tubular

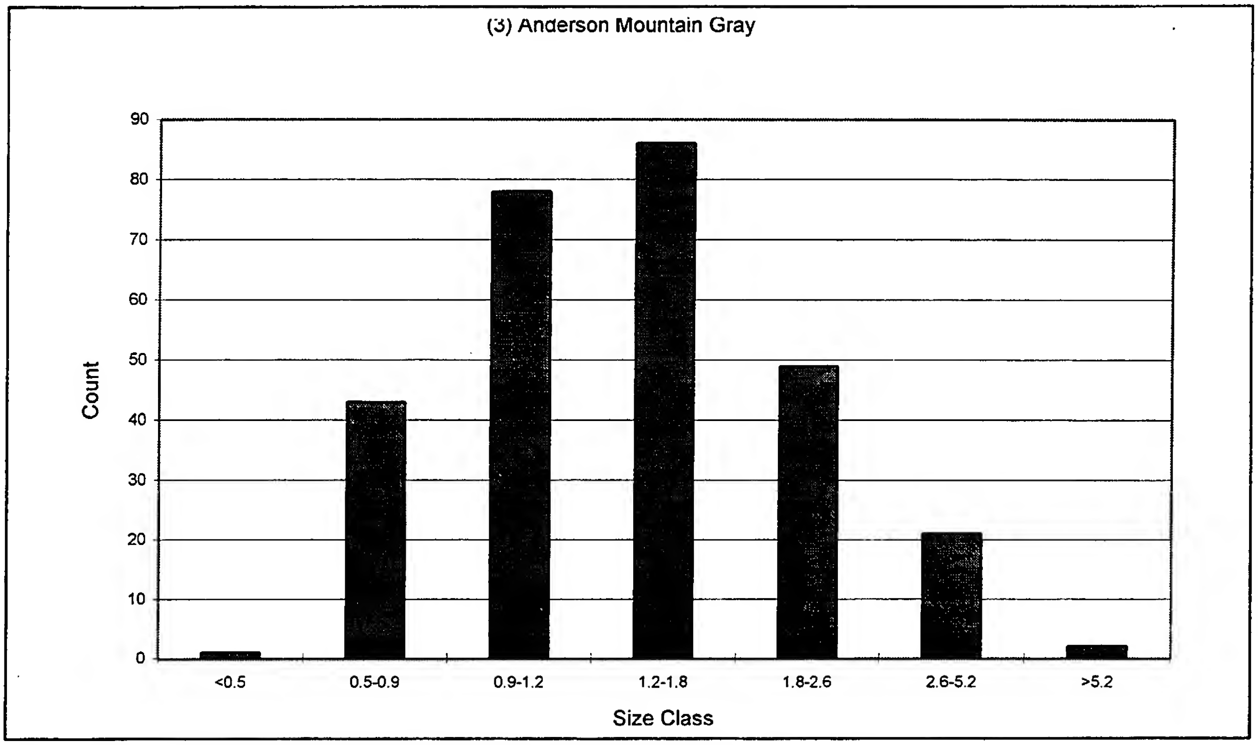


Figure 8.25 Size Distribution of Anderson Mountain Gray.

structure. Overall, the material is starkly different from the other Edwards cherts in the taxonomy; this, combined with the character of the cortex and the fact that it has only been observed as a lag on the Manning surface, suggests that it may represent siliceous concretions formed in a thick soil during the Cenozoic rather than a Cretaceous chert. It is extremely hard in its raw state (it is difficult to break at all, even with a rock hammer) and was judged "poor" in all categories of reduction. However, medium to high heat improves it considerably, such that core flake production and pressure flaking were judged "fair" and biface reduction and thinning were judged "fair/good."

A scant 11 flakes of Seven Mile Mountain Novaculite were recovered during testing. Ten of these were recovered from the Nolan/South group. It appears to be an unfavored material, which is unsurprising given its extremely poor workability relative to the other, abundant chert varieties available on the landscape.

8.1.3.4 Cowhouse Creek Alluvial Cherts

In addition to the cherts described previously, 11 new chert types were defined from the bedload of Cowhouse and Table Rock Creeks. These types are described in detail elsewhere in this volume (see section 4.3.1.1 and Appendix I). Examples of each type were recovered in the debitage from the investigated sites, albeit in low to very low numbers (ranging from a high of about 0.6% to less than 0.006% of the identified total). Significant numbers of the Cowhouse types were limited to four provinces: West Cowhouse, Table Rock, Nolan/South, and Shell Mountain. While the former two site groups would be expected to yield significant numbers of the alluvial materials, their presence in the latter two groups is relatively surprising.

The most common types recovered included Cowhouse Mottled, Cowhouse Dark Gray, Cowhouse Mottled/Banded, and Cowhouse Mottled/Flecked. These four types were also the

most common in the projectile point and tool assemblages. One projectile point each representing Cowhouse Mottled, Cowhouse Dark Gray, and Cowhouse Mottled/Flecked was recovered. The tool assemblage was much more diverse, with 30 tools (4.2% of the identified total) representing 13 different tool types composed of Cowhouse Mottled, 13 tools (1.8%) representing seven tool types composed of Cowhouse Dark Gray, 53 tools (8.5%) representing 12 tool types composed of Cowhouse Mottled/Flecked, and 4 tools (0.5%) representing 4 types composed of Cowhouse Mottled/Banded. Thus, while these four types comprise only 2.7% of the debitage, they collectively represent 14% of the recovered tools.

8.1.3.5 Summary of Material Type Utilization

As the preceding discussion illustrates, while a wide range of materials occur in the sites on Fort Hood, the majority of lithic production activity appears to be focused on relatively few types (Fort Hood Yellow, Heiner Lake Tan, and Heiner Lake Translucent Brown). A second tier of types, which occur with regularity but not in the dominant numbers of the top three types (e.g., Owl Creek Black, Gray/Brown/Green, Fort Hood Gray), is also apparent. Finally, the majority of types represent only limited and probably typically expedient use. The exception to this generalization is provided by the four principal Cowhouse province types (Cowhouse Mottled, Cowhouse Dark Gray, Cowhouse Mottled/Banded, and Cowhouse Mottled/Flecked), which are represented in the tool assemblage in numbers that far outstrip their representation in the debitage.

While none of the three preferred types are "poor" lithic materials, with the exception of Fort Hood Yellow, neither are they necessarily the "best" materials from a purely technological standpoint. As a cursory examination of the size distribution graphs presented above demonstrates, the size distribution of these principal types typically peaks in the relatively small size grades, while the lower "tier" materials typically peak in the medium to large size grades (although not always; cf. Owl Creek Black). This suggests that either (1) the "lower tier" materials were reduced in a different manner, and usually for a different purpose than the principal types, or (2) the distinction is an artifact of the inherent "identifiability" of the various types, such that the second "tier" materials are less likely to be identified when flake size is small. Because the second scenario is at least as likely as the first, the results of the analysis must be viewed with a measured dose of caution.

8.1.4 Theoretical Perspective and Technological Interpretations

The previous discussion viewed chert utilization from a spatial perspective relative to the nine site groupings. Although this is a necessary starting point, the interpretation of human behavior requires technological analyses within a spatial context to determine possible procurement behaviors. The following section attempts to provide a theoretical framework for viewing the movement of cherts across the prehistoric landscape at Fort Hood.

Binford (1979:259) defines the embedded collection strategy of lithic procurement as a strategy where material is "normally obtained incidentally to the execution of basic subsistence tasks." It appears in the Fort Hood case that the cultural cost of procuring Southeast Range materials was not high enough to preclude their usage, as evidenced by their dominating presence in the assemblages. In reality the cost would be essentially nothing if one accepts Binford's logic, as follows:

> The procurement strategy was embedded within some other strategy and, therefore, the cost of procurement was not referable to the distance between the source location and the location of use, since the distance would have been traveled anyway (Binford 1979:259-260).

Possibly we are looking at the issue from the wrong angle or maybe at the incorrect issue. Are we troubled by the fact that the aboriginals were

using material other than what is considered by modern knappers to be prime material (Dickens 1993; Frederick and Ringstaff 1994)? Or, are we forgetting that aboriginals were highly mobile and that the presence of Heiner Lake varieties in distant sites is an expression of this fact? According to Binford (1979:259) "*Very rarely, and then only when things have gone wrong, does one go out into the environment for the express and exclusive purpose of obtaining raw material for tools*" (emphasis in original).

Goodyear (1989:5) would appear to agree with Binford's assessment in stating that his research indicates chert movements of 200 to 400 miles from the source. He cites evidence presented by Hester and Grady (1977:92) that "90 to 120 miles would be a reasonable radius for a band territory." Modern hunters and gatherers, although under different environmental constraints, are highly mobile and appear to stress the movement of people to gain access to needed resources (cf. Yellen 1977; Yellen and Harpending 1972). In regard to mobility it is only a small group or groups of people that go off in search of resources while the majority of the residents stay at the main camp (Spiess and Wilson 1989:97).

In the Fort Hood case, our best estimate is that the inhabitants of the region were engaging in forays of up to a week's duration within which the collection of lithic raw materials was embedded. The most logical assumption would be that this special purpose trip was subsistence related.

Of further interest is in what form the raw material was brought back to the main camp. The answer to that question requires an analysis utilizing attributes that denote reduction strategy (core versus biface) as well as stage of manufacture, and compares the debitage data to the lithic core and tool assemblage. The integrated approach to lithic analysis allows interpretations to be drawn as to the form in which nonlocal lithic sources were being brought to the sites, i.e., already completely decortified or in rough quarry form.

To better understand the mechanics of lithic procurement, the debitage from the nine site groupings was examined using the chert province as the primary division. Utilizing criteria derived from experimental data of lithic reductions of multidirectional core, nodule/biface, flake/biface, and a composite assemblage (Tomka and Fields 1990), and archeological data from two projects (four sites) (Fields et al. 1990; Tomka 1994), the Fort Hood debitage was examined for seven distinguishing characteristics. These were (1) the percentage of flakes less than 0.9 cm in size; (2) the percentage of these flakes which are decorticate; (3) the percentage of flakes greater than 1.8 cm; (4) the percentage of these which are decorticate; (5) percentage of total assemblage (by chert province) that are decorticate; (6) the percentage of flakes in the 0.9 to 1.8 cm range; and (7) the percentage of decorticate flakes in each site grouping (Table 8.9).

The Fort Hood size categories are based on Dickens and Dockall's (1993) mass debitage analysis that trades in depth technological analysis for a limited number of attributes. Dickens and Dockall (1993) utilized a sieve set to measure maximum debitage dimensions in the Texas A&M work at Fort Hood. This method was modified for the Mariah testing effort. The size categories have been correlated with a standard breakdown used in the experimental work and the analysis of the four sites. The choice of attributes follows what has been demonstrated to hold true in experimental work and its comparison to archeological assemblages (Hines, Tomka, and Kibler 1994; Tomka 1994; Tomka and Fields 1990) (Table 8.10). In a recent study, Hines, Tomka, and Kibler (1994), found that the cross-tabulations of attributes most indicative of staged biface manufacture, give insight into the form in which raw material arrived at their discard sites. At Wind Canyon (Hines, Tomka, and Kibler 1994), raw materials were imported from a variety of locations, and were utilized for different functions. This situation is similar to Fort Hood (see section 8.2).

The following discussion will proceed from the western site groupings to the eastern ones, covering the chert provinces in following order: West Fort, Southeast Range, North Fort, and Cowhouse. It must be remembered that tool presence does not imply on site manufacture, and conversely that the lack of certain expected tools does not mean off site manufacture. Rather, debitage is the best gauge of what happened technologically at a site, taphonomy and preservation issues notwithstanding.

8.1.4.1 West Cowhouse Group

The West Cowhouse site grouping is a medium-sized assemblage of 1,200 flakes of identifiable chert and cortex type. The percentage of noncortical flakes in the entire assemblage is 81.2%. This percentage is slightly higher than the experimental norm for biface manufacture which ranges from 70% to 75% tertiary flakes (Hines, Tomka, and Kibler 1994:64; Tomka 1994:60-61; Tomka and Fields 1990:222). No flakes of West Fort chert province material smaller than 0.9 cm in size were recovered, which may indicate that the materials from this province were not reduced to a stage where these sizes would be produced. However, the site group does have the second highest percentage of large flakes of all site groups and the highest percentage of large noncortical flakes. This would imply that not only were rough quarry-blanks, or early stage bifaces, being brought to the site, but the raw materials may have outcropped as large nodules.

The Southeast Range cherts are 100% noncortical at the less than 0.9 cm size, implying that reduction continued at the site after prepared flake-blanks were brought in. This is supported by the high percentage of flakes greater than 1.8 cm in size (30.8%) and a corresponding low percentage of noncortical flakes in that category (19.7%). Large-scale biface manufacture of Southeast Range material is supported by the moderately high percentage of flakes in 0.9 to 1.8 cm size (54.7%) and the high percentage of noncortical flakes (85.2%) implying the importing of prepared blanks. Although the above figures reflect the averages, the range of variation is large. Less than one-third of the two most dominant chert types, Heiner Lake Tan and Heiner Lake Translucent Brown, occur as flakes greater than 1.8 cm in size, while approximately 50% or more of Fossiliferous Pale Brown, Heiner Lake Blue, and East Range

Table 8.9 Comparison of Debitage Size Groups Used for Fort Hood to those of Other Analyses.

Dickens and Dockall (1993)	Mariah (this study)	Other Research
<7 mm	<0.5 cm	0-10 mm
7-13 mm	0.5-0.9 cm	0-10 mm
7-13 mm	0.9-1.2 cm	11-20 mm
13-17 mm	1.2-1.8 cm	11-20 mm
17-26 mm	1.8-2.6 cm	21-30 mm
26-54 mm	2.6-5.2 cm	31-40 mm
26-54 mm	2.6-5.2 cm	41-50 mm
>54 mm	>5.2 cm	51+ mm

Table 8.10 Experimental and Archeological Data.

	% <0.9 cm	% < 0.9 cm, decorticate	% >1.8 cm
Experimental Data			
Composite	6	-	35
Multidirect Core	1	-	46
Nodule/Biface	5	-	36
Flake/Biface	12	-	26
Archeological Data			
Jewett Mine 41LN29A, 106	16	-	20
Washington-on-the Brazos SHP*			
41WT5	3	2.5	47.3
41WT32	5.1	4.1	47.9

* Data derived from Tomka 1994:60-61.
All other data derived from Tomka and Fields 1990:222.

Flecked are greater than 1.8 cm in size. Of note is that 8.7% of Fossiliferous Pale Brown noncortical flakes are greater than 1.8 cm in size. The implication of this discrepancy is that reduction strategies differ significantly for the various Southeast Range materials, with the further implication that Heiner Lake Tan and Heiner Lake Translucent Brown are most favored for complex reductions, such as the manufacture of projectile points.

North Fort chert province material has twice the percentage of flakes less than 0.9 cm in size at 31% than Southeast Range but like Southeast Range cherts, all of these small flakes are noncortical. Approximately 23% of flakes are greater than 1.8 cm in size and occur as cortical flakes in even higher percentages. This indicates that a similar reduction model to that present for Southeast Range materials was being exercised with North Fort cherts; however, it would suggest that the preparation of flake-blanks did not progress as far before importation, possibly only to early stage biface manufacture (quarry-blank). This is further supported by specific data from individual chert types; the "preferred" North Fort materials (e.g., Fort Hood Yellow and Owl Creek Black) have the highest percentages of less than 0.9 cm at 36.3% and 48.6%, respectively, and the least "preferred" materials have the highest percentage of greater than 1.8 cm in size. North Fort has the highest percentage of noncortical flakes overall (84.2%), which supports the proposition that more biface reduction was taking place onsite. The interpretation posited from the distribution of size classes among the North Fort cherts is that certain cherts were favored for certain tools. This will be explored in section 7.2.

Cowhouse materials exhibit a very low percentage of flakes less than 0.9 cm in size (1.8%), of which all are noncortical and have the highest percentage of large flakes at 54.5%, of which 79% are cortical. The Cowhouse cherts with the highest percentage of flakes greater than 1.8 cm in size, the lowest ratio of noncortical flakes (50%), imply a high amount of onsite reduction. This is logical given the West Cowhouse site grouping is in the Cowhouse Creek channel.

The comparison of these data to the experimental and archeological assemblages suggests that the West Cowhouse site group assemblages represent a mixture of core and biface manufacture complicated by a variety of raw material procurement strategies. Unfortunately, the West Fort tool assemblage consists of only two dart points, making it impossible to compare tool products with the debitage. However, this in itself is indicative of the bias against using West Fort materials for tool manufacture. Southeast Range materials are represented by high percentages of diverse nonprojectile tools. Further, 58.6% of the projectile points and other tools from West Cowhouse are made of Southeast Range cherts following the general trend clearly seen in all lithic artifacts (see section 8.2). The North Fort materials closely follow the pattern seen for Southeast Range cherts but with slightly lower percentages in all but the less than 0.9 cm category. The North Fort material projectile points occur in significantly lower frequency than Southeast Range chert. These data suggest procurement strategies that put a high reliance on the Southeast Range and North Fort province materials even over nearby Cowhouse gravels.

8.1.4.2 Shell Mountain Group

The Shell Mountain site grouping is a large collection of debitage composed of 3,488 specimens with identifiable chert and cortex attributes. The percentage of noncortical flakes for the entire assemblage is 93.1%, at least ten percentage points higher than West Cowhouse site grouping. This is lower than the total assemblage rate for the West Cowhouse site grouping, but slightly higher for identifiable chert. Flakes less than 0.9 cm in size comprised 17.8% of the West Fort finds, and all of these flakes are noncortical. Flakes greater than 1.8 cm in size comprise 28.5% of the total, less than one-sixteenth of which are cortex bearing flakes. These are higher and lower percentages, respectively, compared to the West

Cowhouse site grouping and may indicate a slightly different resource procurement and reduction strategy. However, the difference is due to sample size and should not be discounted. It appears that the preparation of flake-blanks was probably occurring off-site, but possibly not to the extent seen in West Cowhouse and/or that the tools being manufactured were slightly less specialized. There are no projectiles of West Fort variety cherts and the nonprojectile tool assemblage is evenly split between unifacial and bifacial tools. The resharpening of unifacial tools may have artificially inflated the small size category, especially since the percentage of noncortical flakes is 100%. The West Fort noncortical flakes are 94.6% of the assemblage and clearly suggest the importation of flake-blanks from which unifaces and bifaces could have been manufactured.

The Southeast Range materials have high percentages of flakes less than 0.9 cm in size. Slightly less than 100% of these are noncortical specimens. These data indicate late stage biface or preform reduction which is clearly supported by the fact that 53.6% of bifaces in the nonprojectile point assemblage and the nearly 50% of projectile points are manufactured from Southeast Range cherts. This could also indicate that resharpening of unifaces and bifaces was a major tool manufacture activity at the sites. The percentage of flakes that are greater than 1.8 cm in size is slightly higher than the percentage of flakes in the smallest category, indicating that flake-blanks were imported to the site, possibly in a middle stage of reduction given that 18.5% of these flakes are noncortical. Further, over 50% of Southeast Range cherts are between 0.9 and 1.8 cm in size, of which 90% are lacking cortex. Overall, a slightly lower percentage of the Southeast Range cherts are noncortical compared to the West Fort (90.9%). However, this is possibly the result of flake-blank importation and size of raw material.

Fossiliferous Pale Brown flakes deviate from the 10 to 25% clustering of 1.8 cm or greater flake size. Fully 53.5% of the Fossiliferous Pale Brown flakes were 1.8 cm in size or larger and nearly half of these were cortex bearing. Another deviation noted is that of Heiner Lake Translucent Brown, where 88.5% of flakes are between 0.9 and 1.8 cm in size, all lacking cortex. Once again, this indicates significant middle stage biface production.

North Fort materials comprise 84% of all the identifiable chert flakes less than 0.9 cm in size; 98% of these are noncortical specimens. This chert province has the lowest number of large flakes (10.9%) and the lowest percentage of noncortical specimens in the assemblage (8.5%). This may be a function of the irregularly sized and shaped character of North Fort raw materials (Frederick and Ringstaff 1994). However, two chert types, Fort Hood Gray and Gray/Brown/Green, are notably rich in flakes greater than 1.8 cm in size and in noncortical flakes. Yet since the sample size for these two types are only 3.7% of the total sample, the percentage of Fort Hood Yellow trends overwhelm the sample vagaries. Only Gray/Brown/Green differs from the general trend at 78.6% noncortical flakes, indicating a different final product reduction strategy for this chert type.

The North Fort province exhibits the second highest percentage of noncortical specimens (94.3%) reflecting and reaffirming that a high amount of final stage biface reduction took place on the North Fort materials at the site. Slightly less than half of the flakes of this chert province are 0.9 to 1.8 cm in size, 50% of the total flakes are usually found to be in this size (Hines, Tomka, and Kibler 1994:64; Tomka 1994:60-61; Tomka and Fields 1990:222). The tool breakdowns support the proposition that late stage bifaces are predominately of North Fort material in this site grouping. Further, this chert province is represented by the same number of projectile points as are Southeast Range cherts.

The distribution of Cowhouse province materials is similar to West Fort cherts, except in that the amount of noncortical flakes represented mostly by flakes larger than 1.8 cm in size. This is contrary

to what is expected in normal biface manufacturing debris as noted above. The diversity of nonprojectile point tools of Cowhouse chert follows the pattern observed for the Southeast and North site groups. However, only one projectile point is made from Cowhouse province material (Cowhouse Dark Gray).

The comparison of these data to the experimental and archeological assemblages suggests that the Shell Mountain assemblage represents a mixture of core and biface manufacture, complicated by a variety of raw material procurement strategies. Unlike most of the other groups, North Fort materials, not Southeast Range materials, make up the bulk of the assemblage.

8.1.4.3 Stampede Group

The Stampede site group contains a small lithic assemblage composed of 135 flakes of identified for cortex and chert, of which 85.9% are noncortical specimens. This figure is moderately high in comparison to the "normal" bifacial reduction debitage percentage. West Fort chert province materials are only represented by one cortex-bearing and one noncortical specimens in the 0.9 to 1.8 cm categories. The Southeast Range chert material is all greater than 0.9 cm in size; 22.2% of the flakes are greater than 1.8 cm in size of which 85.7% lack cortex and 72.2% of the flakes are 0.9 to 1.8 cm in size. This suggests that the final products of this reduction are bifaces larger than projectile points. While six dart points of Southeast Range chert are present no nonprojectile tools of Southeast Range materials are present in the assemblage. Manufacture of these points should have produced small flakes; the lack of these flakes implies the points were manufactured elsewhere.

Material from the North Fort chert province comprises all of the small flakes recovered and it is 16.7% of the total North Fort material found. Almost all of these flakes are noncortical specimens. Nineteen percent of the flakes are greater than 1.8 cm in size and 68.7% of these are noncortical flakes. This is a smaller percentage than the Southeast Range materials. A higher percentage of flakes belonging to this chert province are present in the 0.9 to 1.8 cm size category. This is lower than the Southeast Range materials but much higher than the other two site groupings discussed thus far. The total nonprojectile point tools are represented by only seven tools and only two of these are North Fort province material. Further, only two North Fort projectile points (made of Fort Hood Gray and Gray/Brown/Green) are present.

While Cowhouse province material is not represented in the small size category, it is almost evenly represented in the 0.9 to 1.8 cm and greater than 1.8 cm size categories. More than half of these flakes lack cortex. The percentage of flakes between 0.9 and 1.8 cm in size approximates the norm. In total, 80.9% of the Cowhouse province materials are noncortical. These data may indicate a use of larger, decortified artifacts. The tools are represented by a single spokeshave.

The comparison of these data to the experimental and archeological assemblages suggests that the Stampede site grouping assemblages are a mixture of core and biface manufacture complicated by the raw material procurement strategies of the site inhabitants. In this site grouping, as in the Shell Mountain group, North Fort province is the predominate source. A discussion of individual chert type patterns for debitage can not be presented due to the rather small sample sizes (total n=135). To further subdivide such a small sample would not make sense.

8.1.4.4 Table Rock Group

The Table Rock site grouping is composed of 188 flakes, of which 77.2% are noncortical. There are no flakes of the West Fort chert province less than 0.9 cm in size. The largest size category, greater than 1.8 cm, comprises 18.2% of the assemblage and half of these lack cortex. A very high percentage of flakes (81.8%) are found in the 0.9 to 1.8 cm categories; all are lacking cortex. This

indicates that very large artifacts are being produced or that the raw material size is a more important factor than is seen in site groups already discussed. No tools manufactured from material belonging to this chert province are present. This leaves no alternative than to postulate that these tools were removed from the site(s).

The Southeast Range cherts have only two flakes in the less than 0.9 cm size category. Thirty-eight percent of the Southeast Range chert flakes are greater than 1.8 cm in size, and 58.3% of them are 0.9 to 1.8 cm in size. This is a normal distribution for other biface reduction debitage samples. A moderately high percentage of Southeast Range chert flakes are noncortical (86.7%). These percentages would indicate that the tools of this material are moderately small artifacts with little or no rejuvenation. This supposition is supported by the high percentage of early and middle stage bifaces that are made from Southeast Range province material and the one side-scraper recovered. However, it does not explain the presence of three projectile points.

The North Fort chert province material follows the pattern seen in the Southeast Range material, but with a slight reallocation of percentages since 13.6% of the flakes are less than 0.9 cm in size. The supposition is that there may be higher numbers of smaller tools in the assemblage or the presence of rejuvenation of these small tools. This is supported by the diversity of the tools made from North Fort cherts, and the three dart points and one arrow point present.

The Cowhouse province materials are more similar to the Southeast Range province patterns than the North Fort province since 9% of the flakes are less than 0.9 cm and of this, only one chert type is represented--Cowhouse Dark Gray. Overall, the percentage of flakes greater than 1.8 cm in size is approximately 20 points higher than the average of all cherts.

The comparison of these data to the experimental and archeological assemblages suggest that the Table Rock site grouping assemblages represent a mixture of core and biface manufacture complicating by the raw material procurement strategies of the inhabitants of these sites. These practices include a nearly equal reliance on North Fort, Southeast Range, and Cowhouse province materials.

8.1.4.5 Turkey Run Group

The Turkey Run site group only contains 17 flakes and as such, is not large enough to subdivide for chert province analysis. Moreover, no tools are present with which to compare the debitage patterns.

8.1.4.6 North Nolan/South Group

The North Nolan/South site grouping includes 7,281 identified flakes. Noncortical specimens comprise 94.4% of the assemblage. Since this is the first of the eastern site groupings to be discussed, West Fort chert patterns should vary from the western site groupings. West Fort materials reveal an almost even split between the less than 0.9 cm size category and the 0.9 to 1.8 cm categories. As would be expected, the large size categories are only 7.5% of the total West Fort chert materials. In the small sizes, more than nearly 75% of the flakes lack cortex and a slightly higher than normal amount of flakes are noncortical for the entire West Fort assemblage (83%). This would strongly indicate that flake-blanks of West Fort materials were brought to the sites. Further, it appears that the West Fort cherts, at least at this site grouping, were further reduced or resharpened onsite. The West Fort material tool assemblage consists of a single unifacial tool.

Thirty-seven percent of the Southeast Range province flakes are less than 0.9 cm in size and 37% of the total are noncortical. The greater than 1.8 cm size categories comprise 18% of the debitage, of which over three-quarters are lacking cortex. Less than 50% of the debitage of Southeast Range chert is in the 0.9 to 1.8 cm in size and 95% are decorticate. The high amounts

of Heiner Lake Tan and Heiner Lake Translucent Brown have skewed the Southeast Range averages. These two chert types makeup 90% of the cherts and form on end of the continuum with small numbers of large flakes (13% to 19%) and large amounts of small flakes (48% to 32%). Fossiliferous Pale Brown, has the lowest numbers of less than 0.9 cm size flakes than the average (17.7% vs. 37.3%). Further, the percentage of Fossiliferous Pale Brown and Heiner Lake Blue (light) greater than 1.8 cm are much higher than average. Heiner Lake Blue and East Range Flecked are more similar to the Heiner Lake Tan and Heiner Lake Translucent brown. Additionally, the numbers of noncortical flakes are high in this category, but reflect once again the importance of flake-blanks.

Surprisingly, 94.8% of the Southeast Range province chert is noncortical. It would be expected that since this site grouping is in the middle of this chert province, the raw materials would be brought to the site without prior reduction. However, it appears that the inhabitants of the North Nolan/South sites may have been using a directed collection strategy since the cost of traveling to the quarry would be no more than a day trip, and could be integrated into daily gathering of plant materials. In a sense this is still an embedded strategy, but it may be more accurately referred to as a foraging strategy.

The nonprojectile point tools made from Southeast Range material overwhelm the total sample (84%) and show a large diversity of tool types but for the most part, small percentages of each tool type occur. The debitage data coupled with the large percentage of projectile points from these chert province (71%), indicate that a large amount of small tool manufacture or resharpening of tools occurred onsite.

The North Fort cherts are similar in patterning to the Southeast Range materials but have slightly lower percentages for the small size categories and almost twice the percentage for the large size categories. The middle-ranged sizes, of which there should be approximately 50%, are insignificant in their difference (44.6% Southeast vs. 41.5% North Fort). The total percentage of noncortical flakes of the North Fort materials differs from the Southeast Range materials by an insignificant three percentage points.

One chert type, Fort Hood Gray is skewed toward the larger sized flakes, and thus deviates from the average pattern. The chert type Gray/Brown/Green has relatively low occurrence percentages of less than 0.9 cm and greater than 1.8 cm sized flakes, respectively. Only Owl Creek Black and Gray/Brown/Green have any small flakes; for Owl Creek these small flakes make up 50% of the sample.

The North Fort province tool assemblage is much smaller than the Southeast Range province assemblage. The production of these tools would be evidenced by a moderately high percentage of middle-sized range flakes and a high percentage of small flakes. The percentage of large-sized flakes may be a function of the importation of unprepared nodules or the reduction of multidirectional cores; however, the only cores from this site grouping are of Southeast Range chert. The possibility exists that still viable cores were taken off-site to another camp, especially considering the high percentage of Fort Hood Gray tools. The cherts with the small-sized flakes are also the materials from which the most tools were made.

The Cowhouse province materials are different from the other three chert province patterns except in the percentage of flakes in the middle-size ranges. The relatively evenly split percentages between the middle and large-sized flakes may mean that the Cowhouse province materials are being utilized for large-sized artifacts. This is partially supported by the lack of projectile points of Cowhouse province materials and the percentages of staged bifaces that may have been intended for projectiles. However, the tool assemblage does not contain artifacts which would be considered to be large artifacts, such as choppers.

The comparison of these data to the experimental and archeological assemblages suggests that the North Nolan/South site grouping assemblages are a mixture of core and biface manufacture complicated by the raw material procurement strategies of the site inhabitants. The Southeast Range chert province is the predominate source at 96% of the recovered material. This is significant given the large sample size present. North Fort and Cowhouse provinces are a distant second and third, respectively, in preference. West Fort materials are present in such small numbers that it is not feasible to discuss any deviations from the patterns seen for the province.

8.1.4.7 Cowhouse/Taylor/Bear Group

The Cowhouse/Taylor/Bear site grouping is among the smaller assemblages, with only 201 flakes identified for chert and cortex type. The total assemblage is 79.6% noncortical flakes which is close to what would be expected. The West Fort and Cowhouse chert provinces occur in numbers too small to detect valid patterns (Cowhouse n=6; West Fort n=20).

The Southeast Range province materials include 76.7% noncortical specimens, which is fairly indicative of biface manufacture. However, approximately 50% of the flakes are larger than 1.8 cm in size, almost three-quarters of which are lacking cortex. Three-quarters of the nonprojectile point tools are Southeast Range cherts; however, only 25% of the projectile points are made of this chert province's material.

The North Fort province materials are 80.6% noncortical flakes, a moderately high percentage representing mixed biface and core reduction. However, the percentage of small flakes is at least twice as high as the experimental data indicates it should be for flake/biface manufacture and three times the percentage for a composite sample. This may indicate that a great deal of resharpening was taking place at the site. The percentage of large-sized flakes is just under half that seen for the Southeast Range province materials; noncortical flakes make up approximately three-quarters of this assemblage. The numbers of flakes in the middle-sized range is consistent with the experimental norm. As with the North Nolan/South site grouping, Fort Hood Gray chert has a high percentage of greater than 1.8 cm flakes and a lower percentage of middle-sized flakes than the province average. However, the small number of flakes of this type (n=6) leaves no true validity to the recognition of significance.

Although only three North Fort province material tools were recovered, half of the recovered projectile points are made of North Fort chert.

The Cowhouse province materials are represented by too few flakes to make any meaningful statements.

The comparison of these data to the experimental and archeological assemblages suggests that the Cowhouse/Taylor/Bear site grouping assemblages are a mixture of core and biface manufacture complicating by the raw material procurement strategies of the site inhabitants.

8.1.4.8 East Cowhouse Group

The East Cowhouse site grouping is a small assemblage of 176 specimens of which 80.7% of the debitage is noncortical. This is slightly higher than should be expected. The West Fort chert province is represented by only seven flakes, all of which are middle-size flakes and of which only one has cortex. The Southeast Range province materials are present in percentages similar to the pattern observed for the Cowhouse/Taylor/Bear site grouping with only slight changes. The percentage of small flakes is smaller (3.3%) and all are noncortical. The percentage of larger flakes is 63.0%, three-quarters of which are noncortical, while the middle-sized flakes comprise less than half of the assemblage. Collectively this suggests that large flakes or flake-blanks were being produced. Fossiliferous Pale Brown and Heiner Lake Blue are noticeably different from the majority of the materials, evincing higher than

average and lower than average ratios of large flakes, respectively.

The richness of nonprojectile point tools is high and fairly even; possibly whatever large tools were being produced have been removed from the site. No projectile points manufactured from Southeast Range material are present.

The North Fort province assemblage consists of 88% noncortical specimens. The flakes smaller than 0.9 cm occur in twice the relative frequency of the Southeast Range cherts, while the larger-sized flakes occur in three-quarters the relative frequency. The middle-sized flakes are once again at 50% of the total assemblage. Green/Brown Gray chert deviates from the average with more flakes greater than 1.8 cm in size and interestingly all of these flakes are noncortical. Owl Creek Black flakes greater than 1.8 cm in size have lower percentages that the average but have the chert province average of noncortical flakes.

North Fort province materials are represented by one nonprojectile point tool, a graver. However, all projectile points recovered from this site grouping are made of this chert provinces' material.

The Cowhouse province materials are only 61% noncortical, indicating that the tools were not refined and/or not much resharpening of tools was taking place onsite. This is further supported by the almost three-quarters of the entire assemblage consists of flakes greater than 1.8 cm in size. Cowhouse province materials have a higher diversity of tools than the North Fort province and approach the level attained by the Southeast Range. Of course, this is not unexpected given the nature of the North Fort province materials and the aboriginal preference seen in the total lithic assemblage for Fort Hood. The only problem is that, except for two utilized flakes, each nonprojectile tool type is represented by one specimen. No attempt was made to subdivide the chert province into type categories to explain potential patterns.

The comparison of these data to the experimental and archeological assemblages suggests that the East Cowhouse site grouping assemblages are a mixture of core and biface manufacture complicated by the raw material procurement strategies of the inhabitants of these sites. Similarly to some of the other site groupings, the sample size is relatively small.

8.1.4.9 North Nolan/Cowhouse Group

The North Nolan/Cowhouse materials consist of 1,954 identified specimens, and are 88.4% noncortical. The West Fort materials are 85.1% noncortical. Over 13% of the materials are in the small-sized category and just under 100% of these are noncortical. The large size category of flakes is only slightly above one-quarter of the assemblage, of which between half and three-quarters are noncortical. The middle-sized flakes are slightly higher than half of the total assemblage. It would appear then that the tools should reflect the spectrum of diversity. However, only one Anderson Mountain end scraper is present; suggesting that the manufactured tools were removed from the sites.

The Southeast Range province materials indicate production of small-sized tools and/or a higher amount of tool resharpening, as evidenced by 21% of the flakes that were less than 0.9 cm in size, 26.9% that were greater than 1.8 cm in size, and a high (89.6%) percentage of total noncortical specimens. The middle-sized flakes are within the experimental norm. Of the small-sized flakes, 100% are noncortical, and of the large-sized, almost three-quarters are noncortical. The chert types of the Southeast Range province materials vary greatly for the average. Fossiliferous Pale Brown (n=134) has a very low percentage of the less than 0.9 cm sized flakes count at 3%, while the Heiner Lake Translucent Brown (n=621) has a high frequency at 31.7%. Almost 71% of Fossiliferous Pale Brown flakes are larger than 1.8 cm, 43% of which lack cortex. This is interesting since only 51% of the total Fossiliferous Pale Brown flakes lack cortex; however, the high

percentage of the middle-sized flakes (61%) are tertiary in nature. The Heiner Lake Blue (light) have a similar pattern of greater than 1.8 cm flakes but with a lower overall percentage and a higher decortification rate (64.5% and 48.4%, respectively). The East Range Flecked chert has the lowest sample size of Southeast Range province cherts (n=24) and has a lower percentage of greater than 1.8 cm flakes at 8.3%, of which 50% are noncortical.

For the chert types as a whole, the percentage of noncortical flakes in all sizes varies from 51.5% (Fossiliferous Pale Brown) to 96.8% (Heiner Lake Blue), with an average of 89.6%. It would appear that Fossiliferous Pale Brown chert is being used for large-sized tools or outcrops in large-sized nodules.

As has been the case, the Southeast Range province materials are manufactured into a diverse group of non-projectile point tools. A higher percentage of the tools in the assemblage is either late stage bifaces, utilized flakes, or included within the general category of unifaces. The presence of unifaces coupled with the large numbers of small flakes support the notion of tool resharpening. Unfortunately, none of the projectile points in the assemblage have clear evidence of resharpening.

The North Fort province materials are 81.7% noncortical and closely follow the pattern seen in the Southeast Range province materials except for very slight adjustments in the percentages between the small and large-sized flakes. The two most frequent chert types (Fort Hood Yellow and Owl Creek Black) deviate from the average in opposite directions and effectively create the average for this chert province.

The nonprojectile point tools also follow the Southeast Range province pattern but with a smaller sample size. Twice as many projectile points are made of Southeast Range as North Fort chert. These data indicate less evidence of making smaller-sized artifacts and/or less resharpening of tools. The sample size for North Fort province nonprojectile tools is significantly smaller (9.5% vs. 77%).

The Cowhouse materials are 78.2% noncortical, have no small-sized flakes, and are split between the large-sized flakes and the middle-sized flakes. Once again this implies production of large artifacts and little or no resharpening of tools. The North and Cowhouse province materials contribute the same percentage to the nonprojectile tool category (10%); there are no projectile points made of Cowhouse materials in the North Nolan/Cowhouse site grouping.

The comparison of these data to the experimental and archeological assemblages suggests that the North Nolan/Cowhouse site grouping assemblages consist of a mixture of core and biface manufacture complicated by the raw material procurement strategies of the inhabitants of these sites. The debitage sample is the third largest in number and indicates that Southeast Range province material was the predominate chert of choice.

<u>8.1.4.10 Conclusions</u>

The analysis of chert resources at Fort Hood and the integration of the debitage data with tool data has just begun. The initial chert typology, refined by Frederick and Ringstaff (1994) and further revised in this report, still only scratches the surface of the raw material selection process. It has been stated several times in this report that there are many factors which can not be controlled and thus any interpretations of perceived patterns are not absolute. Although we will never know the entire universe of chert resources, several inferences can be posited. However, several factors which may further explain on the issue of raw material preference and the potential preferences for specific tools types can be addressed through an expansion of the analysis that has been completed thus far. Moreover, this expansion should be limited to sites that are slated for data recovery in order to have the largest

sample of chert available. It should be noted that although debitage comprises more than 50,000 specimens in the 80,000 item database (about 63%), only a relative handful of these (n=15,000; 30%) are identifiable cherts and thus conducive to our chert preference analyses. This further analysis should include related materials recovered during the earlier work phase and those from the formal testing and assessment phase. The attributes to be added to this lithic analysis should include attributes such as the following: flake platform characteristics, flake dorsal cortex location, flake fragment type, tool fragment type, tool breakage type, and tool cortex location. This would enable the researcher to eliminate some of the more obvious explanations of reduction stage by providing a cross-check to the conclusions.

8.2 LITHIC TOOLS AND OTHER ARTIFACTS

Marybeth S. F. Tomka

8.2.1 Non-Debitage Lithics

8.2.1.1 Methodology and Background

The meaningful analysis and interpretation of artifacts recovered during Mariah's previous phase of work at Fort Hood (Trierweiler 1994) was hampered by the relatively low number of shovel tests at each site and the generally shallow depths of those tests. Since projectile points are considered diagnostic artifacts, these were also collected from the surface. As a result, projectile points were recovered in high numbers but often lacked context. By contrast, the testing program addressed here recovered large numbers of artifacts in relatively good context, and also refined the earlier chert typology. The following discussion of projectile points combines items recovered during the current testing with those recovered during Mariah's reconnaissance phase from the 57 sites under investigation.

The analyzed sample of 317 projectile points includes 49 from the previous phase (Trierweiler 1994) and 268 from the current test excavations. Forty-seven dart points and 24 arrow points could not be typed; additionally, one projectile point could not be classified as either dart or arrow point since it retained only its significantly reworked blade portion. As a result, 247 specimens were classified, with a total of 40 different types of projectile points recovered from the two phases. Of the total of 317 specimens, only 66 points were complete (21%), and 141 were of identifiable chert (44%).

Because of the nature of projectile point typology and the use of multiple subjective categories to classify attributes, it would be a statistical nightmare to define tight ranges of attributes that define a projectile point. Further hampering the interpretation is the nature of Texas point typology and the rather vague definitions present in the literature (Turner and Hester 1993). Moreover, the rather long use-periods, particularly of Archaic dart points, precludes control of point style evolution without tight chronometric data, something which is lacking in most sites excavated in Texas. For these reasons, no attempt was made to compare the various types of points to each other.

As with the projectile points, lithic tools and cores from the earlier work phase were integrated with those from testing. Of the total of 1,377 recovered specimens, 1,275 are chipped stone (94%), 71 are cores (5%), 16 are hammer or abrader stones, and six are ground stone. Sixty-five percent (n=896) are made from identifiable cherts.

8.2.1.2 Projectile Points

The frequency of projectile points by chronological periods represented in site groups is presented in Table 8.11. The most plentiful point types are from the Late Prehistoric (30%). Also occurring in high numbers are specimens attributed to the general Archaic and Transitional Archaic period (15.7% and 17% respectively), with Middle Archaic projectile points contributing 13.8% to the assemblage. The most common type in the entire assemblage (excluding untyped specimens) is the

Table 8.11 Frequency of Projectile Points by Chronological Periods Represented in Site Groups.

Site Group	Paleoindian	Early Archaic	Early Archaic - Middle Archaic	Middle Archaic	Late Archaic	Late Archaic-Transitional Archaic	Transitional Archaic	Late Prehistoric	Grand Total
Cowhouse/Taylor/Bear	1	4	0	1	1	0	5	7	19
East Cowhouse	0	0	0	0	3	0	0	1	4
North Nolan/Cowhouse	1	1	0	5	1	1	9	20	38
North Nolan/South	3	4	1	13	3	4	6	12	46
Shell Mountains	0	4	0	15	14	6	19	34	92
Stampede	0	0	0	2	1	1	0	4	8
Table Rock	1	5	0	2	1	0	4	2	15
Turkey Run	0	0	0	0	0	0	1	1	2
West Cowhouse	0	3	0	6	6	4	10	13	42
Grand Total	6	21	1	44	30	16	54	94	266

Late Prehistoric Scallorn arrow point (n=47; 14.8%). The only other common type is the Middle Archaic Pedernales dart point (n=30, 9.4%). These relative data imply that most occupations investigated are Middle Archaic or younger in age. This is corroborated by the high numbers of absolute dates returned for these sites (Table 8.12, and Appendix D).

The Fort Hood research design (Ellis et al. 1994) proposes to view projectile point data independently from previously published chronologies and from Turner and Hester's (1993) widely used standard for dating ranges. Because the current investigations were designed to assess overall data content and hence NRHP eligibility, this substantive research focus was not undertaken. Where possible, however, matching radiocarbon assays were compared to the Turner and Hester (1993) time ranges and to the dates for each chronological period used as a provisional research framework (see Chapter 2.0).

There are 13 proveniences containing both radiocarbon assays and projectile points, an additional four cases of points and radiometric dates within a 10 cm level of each other, and one case where the separation is three levels (30 cm). A total of 31 projectile points, of which 22 could be typed and thus assigned relative ages, were recovered from these proveniences and 18 assays run. In only four cases do the previous relative projectile point ages and absolute ages have significant differences and two cases where the results differ by a maximum of 90 years without accounting for the standard deviation (see Table 8.12). Of the four differing results, only one was found to have an earlier than expected date; yet, a second assay from the same provenience fits the reported chronology for the point type. The two points with slight differences are both Perdiz arrow points and an adjustment of the point chronology extending it to A.D. 1600 (as Black [1989:32] reports) would account for both these dates.

The total of 317 projectile points was subdivided for discussion purposes by time period, site, site grouping, chert type and intactness. Six projectile points can be classified as Paleoindian. A Barber point with the proximal end missing from site 41BL532 and two Plainview points from sites 41BL154 and 41BL751 (Figure 8.26). Two Angostura points dating to the Late Paleoindian period were recovered from sites 41BL154 and 41BL821 of the North Nolan/Cowhouse site group (Figure 8.26). Only just enough of each point is remaining to determine type classification. The blade and stem portion of a Wilson point (Masson and Collins 1995) belonging to the Late Paleoindian/Early Archaic time period was

Table 8.12 Radiocarbon Assays Associated with Projectile Points.

	Provenience		Radiocarbon Sample		Projectile Point	
Site	TP	Level	Conventional Age	Calendar dates	Point Name	Relative Age Range
41BL433	1	3	1130 ± 170	AD 820	Scallorn	AD 700-1200
41BL567	2	2	790 ± 50	AD 1160	Scallorn (3)	AD 700-1200
41BL567	2	2	790 ± 50	AD 1160	Darl	AD 200
41BL567	2	2	790 ± 50	AD 1160	Other Arrow	AD 700-1600
41BL567	2	2	790 ± 50	AD 1160	Other Dart	8000 BC - AD 700
41BL755	2	5	1580 ± 90	AD 370	Darl	AD 200
41CV97	1	12	3150 ± 100	1200 BC	Other Dart	8000 BC - AD 700
41CV97	BT 1	19	1170 ± 50	AD 780	Pedernales	2000-1200 BC
41CV137	2	13[a]	3640 ± 60	1690 BC	Other Dart	8000 BC - AD 700
41CV127	2	15[b]	3640 ± 60	1690 BC	Pedernales	2000-1200 BC
41CV174	1	14[a]	1670 ± 60	AD 280	Ensor	200 BC - AD 600
41CV174	1	14[a]	1670 ± 60	AD 280	Edgewood	200 BC - AD 600
41CV174	7	9[c]	5290 ± 50	3340 BC	Wilson	8000 - 7700 BC
41CV587	3	2[a]	300 ± 70	AD 1650	Ensor	200 BC - AD 600
41CV595	3	5	1860 ± 80	AD 90	Montell	1000 BC - AD 200
41CV1007	1	12	2520 ± 60	570 BC	Montell	1000 BC - AD 200
41CV1007	1	12	2520 ± 60	570 BC	Castroville	800 - 400 BC
41CV1011	1	2	1760 ± 60	AD 190	Edgewood	200 BC - AD 600
41CV1011	1	2	2610 ± 60	BC 1690	Edgewood	200 BC - AD 600
41CV1038	1	6	360 ± 30	AD 1590	Perdiz	AD 1200 - 1500
41CV1038	1	6	360 ± 30	AD 1590	Other Arrow	AD 700 - 1600
41CV1085	1	4[b]	390 ± 70	AD 1560	Perdiz	AD 1200 - 1500
41CV1167	1	4	450 ± 80	AD 1500	Other Dart	AD 700 - 1600
41CV1167	1	4	450 ± 80	AD 1500	Scallorn (4)	AD 700-1200
41CV1167	1	4	450 ± 80	AD 1500	Other Arrow	AD 700 - 1600
41CV1391	2	5	820 ± 50	AD 1320	Other Arrow	AD 700 - 1600

[a] point is from 1 level above sample
[b] point is from 1 level below sample
[c] point is from 3 levels above sample

recovered from site 41CV174 of the Table Rock site grouping.

A total of 21 Early Archaic points representing eight types were recovered: Andice (n=1); Bell (n=1); Gower (n=1); Martindale (n=3); Nolan (n=1); Hoxie (n=1); Wells (n=1); and Bulverde (n=12) (Figure 8.26). These points consist of various fragments from 12 different sites representing six of the nine site groups. One additional point temporally classified as an Early Archaic/Middle Archaic point by Turner and Hester (1993) is the Morrill from 41BL154.

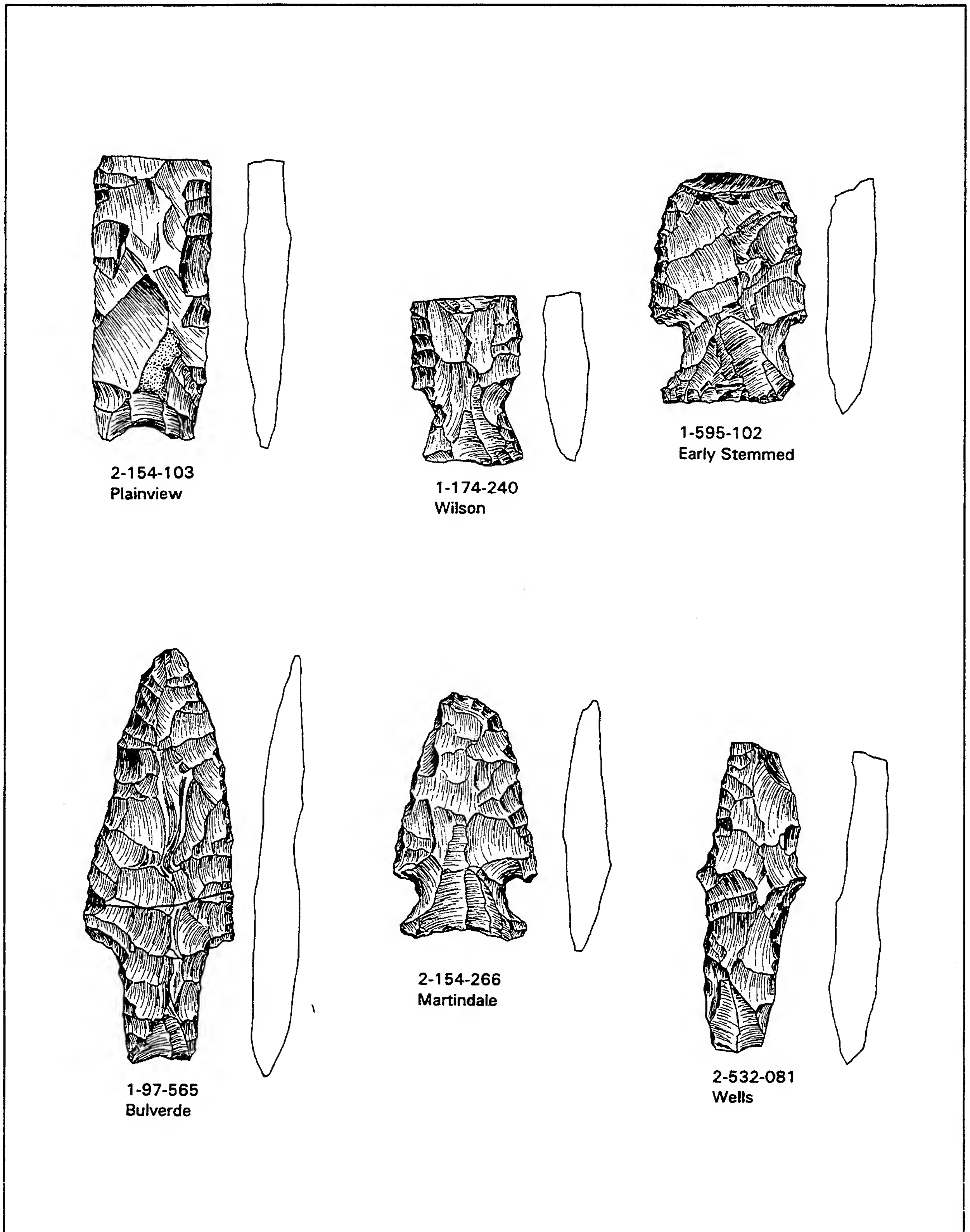


Figure 8.26 Paleoindian and Early Archaic Dart Points.

Forty-four Middle Archaic dart points consist of 12 Marshall, 30 Pedernales, and two Travis dart points (Figure 8.27) were recovered. These points were from sites concentrated in the North Nolan/South (n=13) and Shell Mountain (n=15) site groups, but also present in three other western site groups.

A total of 30 Late Archaic dart points of two types (Castroville [n=22] and Lange [n=8]) from 13 sites, are concentrated in the Shell Mountain site group but also present in seven other site groups (Figure 8.27). Two additional Late Archaic to Transitional Archaic dart point types (Marcos [n=10] and Montell [n=6]) were recovered from eight sites.

The Transitional Archaic is highly represented as evidenced by both the projectile points and radiocarbon assays. As such, there are numerous point types and a high frequency of points. Fifty-four dart points temporally diagnostic of the Transitional Archaic are represented by seven types at 22 sites in seven site groups (Figure 8.28). Twenty-one Darl points, 10 Edgewood points, 3 Ellis, and 15 Ensor points are present. Additionally, one Fairland from site 41CV1011, two Frios from two sites, and two Godley points also from two sites were recovered.

The Late Prehistoric arrow points are represented by eight types totaling 94 specimens and representing all site groups (Figure 8.29). They consist of a Chadbourne, a Cliffton, eight Perdiz, two Sabinal, and 47 Scallorn points (11 of which are complete); one Washita, five Bonham, and four Bulbar Stemmed. An additional 24 arrow points could not be typed.

Mariah's earlier investigations (Trierweiler 1994) attempted to discern a pattern in the chert types recovered for the projectile point artifact types. That analysis included 83 projectile points, 22 of those are combined with 119 specimens recovered during the testing phase, to form a current sample totaling 141 projectile points. Seventeen specimens are arrow points and 123 projectile points are classified as dart points and one as indeterminate projectile. A variety of cross-tabulations were performed to reveal a pattern to the distribution of certain chert types, relative to physiographic regime of the site, time period, chert province, and the particular chert type (general Archaic points were ignored for this analysis). The Southeast Range chert province (n=67, 54.9%), as well as North Fort province materials (n=52, 42.6%) were source areas utilized throughout the entire time frame reflected in these 57 sites. The 122 points are dominated by specimens made from Heiner Lake Tan chert (n=66, 54%). Only Fort Hood Yellow chert (n=26, 21.3%) begins to come close to the frequency of Heiner Lake Tan. These data strongly suggest that the two chert provinces of preference were North Fort and Southeast Range, and specific types within those provinces, Fort Hood Yellow and Heiner Lake Tan were the most preferred material types (Tables 8.13 and 8.14 and Figures 8.30 and 8.31).

Frederick and Ringstaff (1994:Table 6.5; 164) state that Fort Hood Yellow is a higher quality knapping material even when unaltered by heat, but when compared to Heiner Lake Tan the latter is 2.5 times more frequent in the recovered point assemblage. However, the presumed high cost of procurement does not preclude the collection and use of Southeast Range province Heiner Lake Tan. Rather, the data suggest that the chert collection strategy was "embedded" (Binford 1979:259) within other activities that involved traveling to the Southeast Range province. Such procurement would entail a 30 km (18 miles) one-way trip which is a significant time commitment when a highly desirable alternate (at least in modern knappers' opinions), lies at the doorstep of the North Fort area. It would be negligent to assume that there are not any sources of Southeast Range province type material closer, specifically in the areas of the fort that are not well-known or surveyed for chert resources. The proposition of embedded strategies is explored in section 8.1.4.).

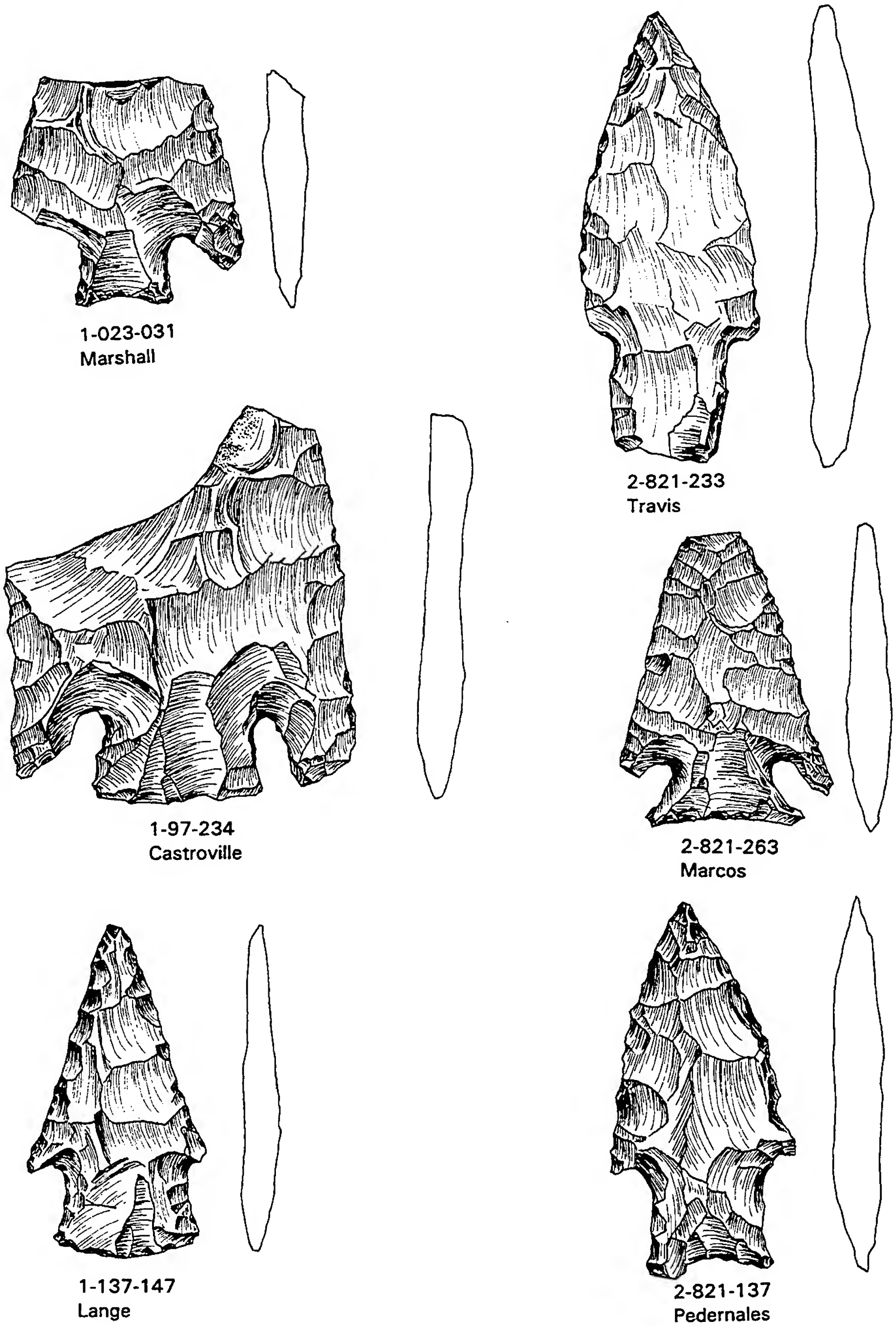


Figure 8.27 Middle and Late Archaic Dart Points.

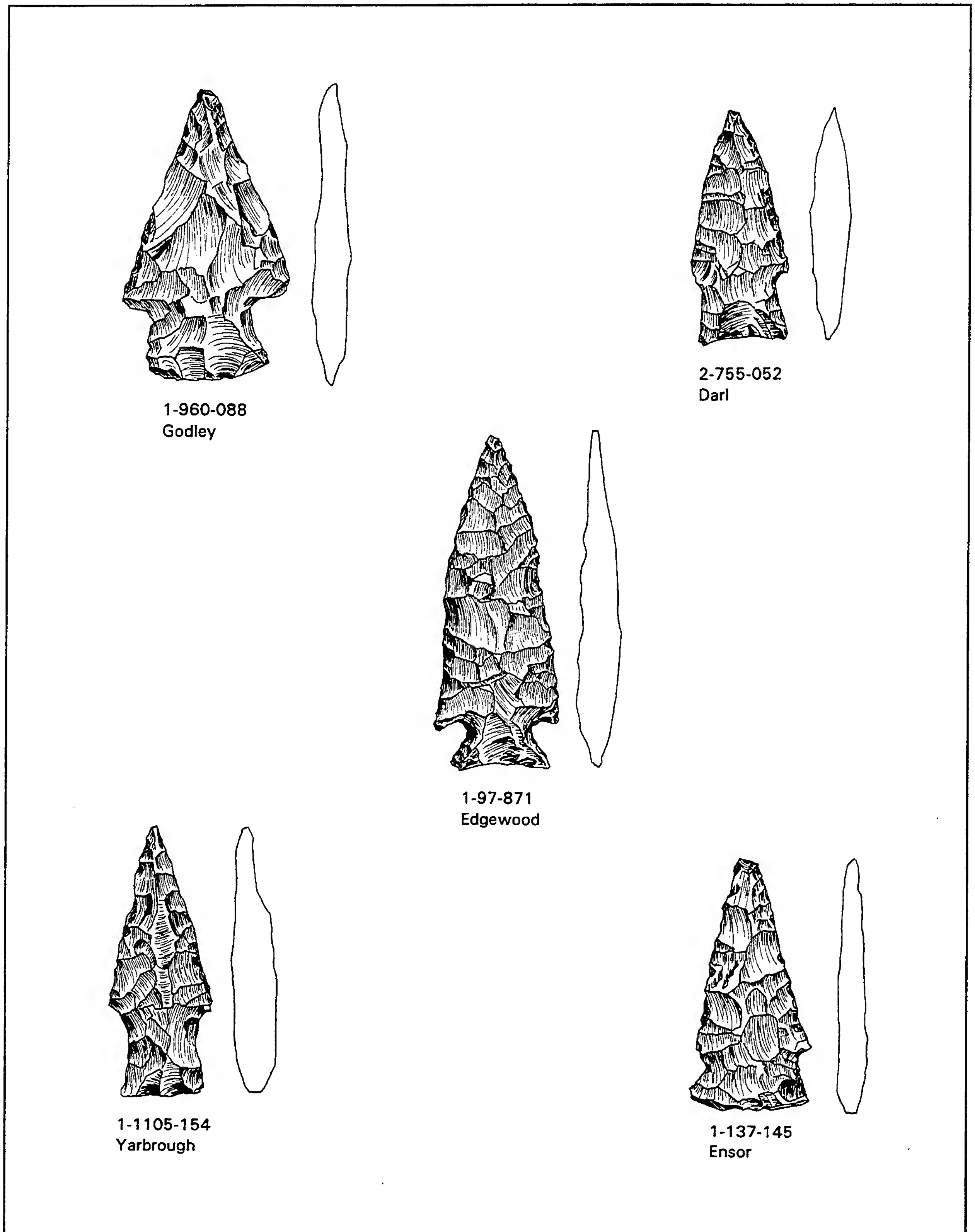


Figure 8.28 Transitional and General Archaic Dart Points.

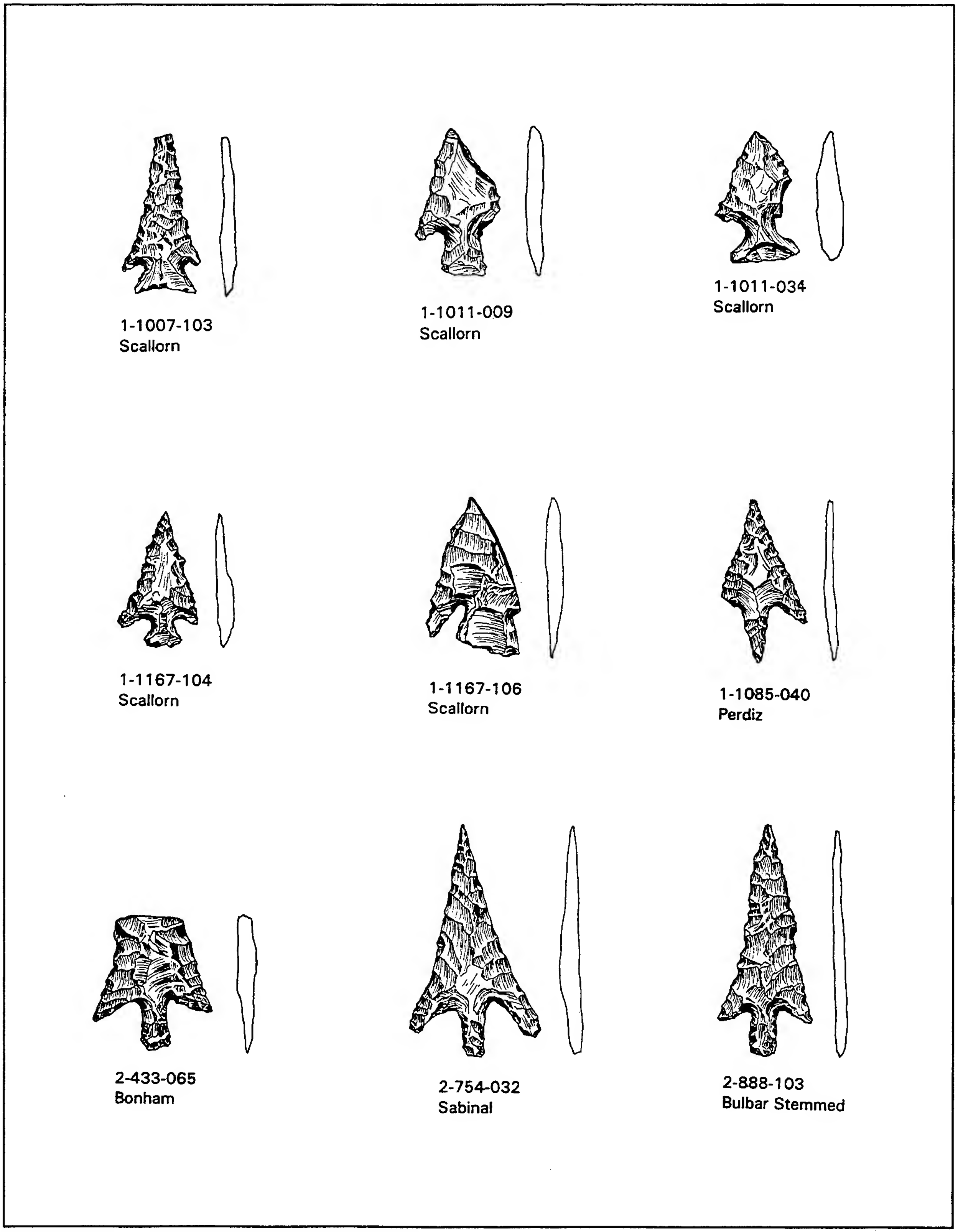


Figure 8.29 Late Prehistoric Arrow Points.

Table 8.13 Chert Provinces Represented by Projectile Point Materials from the Eight Site Groups.

Site Group	Chert Province: West Fort	Southeast Range	North Fort	Cowhouse	Total
Cowhouse/Taylor/Bear	0	2	5	1	8
East Cowhouse	0	0	2	0	2
North Nolan/Cowhouse	0	10	5	0	15
North Nolan/South	0	17	7	0	24
Shell Mountain	0	23	23	1	47
Stampede	0	6	2	0	8
Table Rock	0	3	4	1	8
West Cowhouse	2	17	9	1	29
Total	2	78	57	4	141

Table 8.14 Chert Type Frequency Reflected by the Projectile Points within Site Groupings.

Chert Type	Site Group: Cowhouse/ Taylor/ Bear	East Cowhouse	North Nolan/ Cowhouse	North Nolan/ South	Shell Mountain	Stampede	Table Rock	Turkey Run	West Cowhouse	Grand Total
02-C White	0	0	0	1	0	0	0	0	0	1
03-AM Gray	0	0	0	0	0	0	0	0	2	2
06-HL Tan	2	0	10	13	18	5	3	0	15	66
08-FH Yellow	2	2	2	2	13	0	1	0	4	26
09-HL Tr Brown	0	0	0	3	3	1	0	0	2	9
11-ER Flat	0	0	0	0	1	0	0	0	0	1
13-ER Flecked	0	0	0	0	2	0	0	0	0	2
14-FH Gray	2	0	0	0	2	1	2	0	0	7
15-Gry/Brn/Grn	1	0	1	1	3	1	1	0	3	11
17-Owl Crk Black	0	0	2	4	4	0	0	0	2	12
18-C Mottled	0	0	0	0	0	0	1	0	0	1
19-C Dr Gray	1	0	0	0	1	0	0	0	0	2
22-C Mott/Flecks	0	0	0	0	0	0	0	0	1	1
Grand Total	8	2	15	24	47	8	8	0	29	141

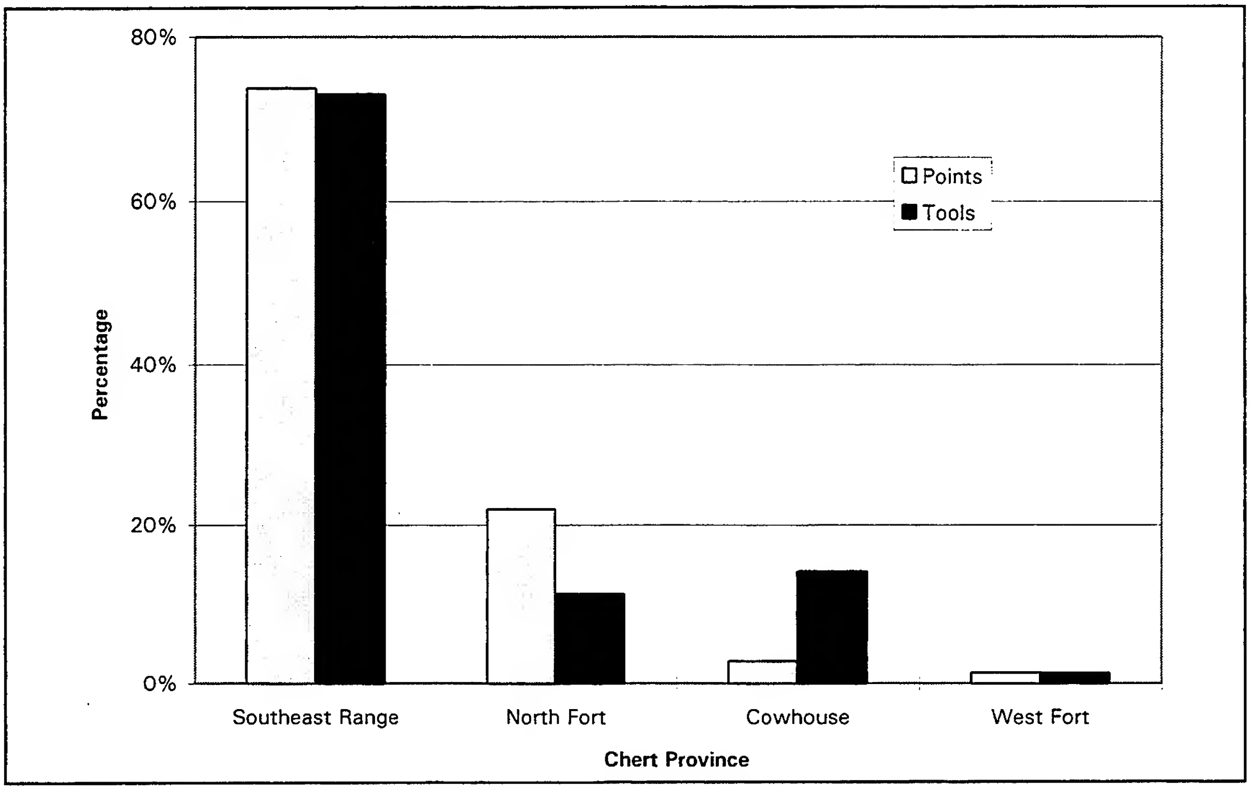


Figure 8.30 Chert Usage of Projectile Points and Other Tools by Chert Province.

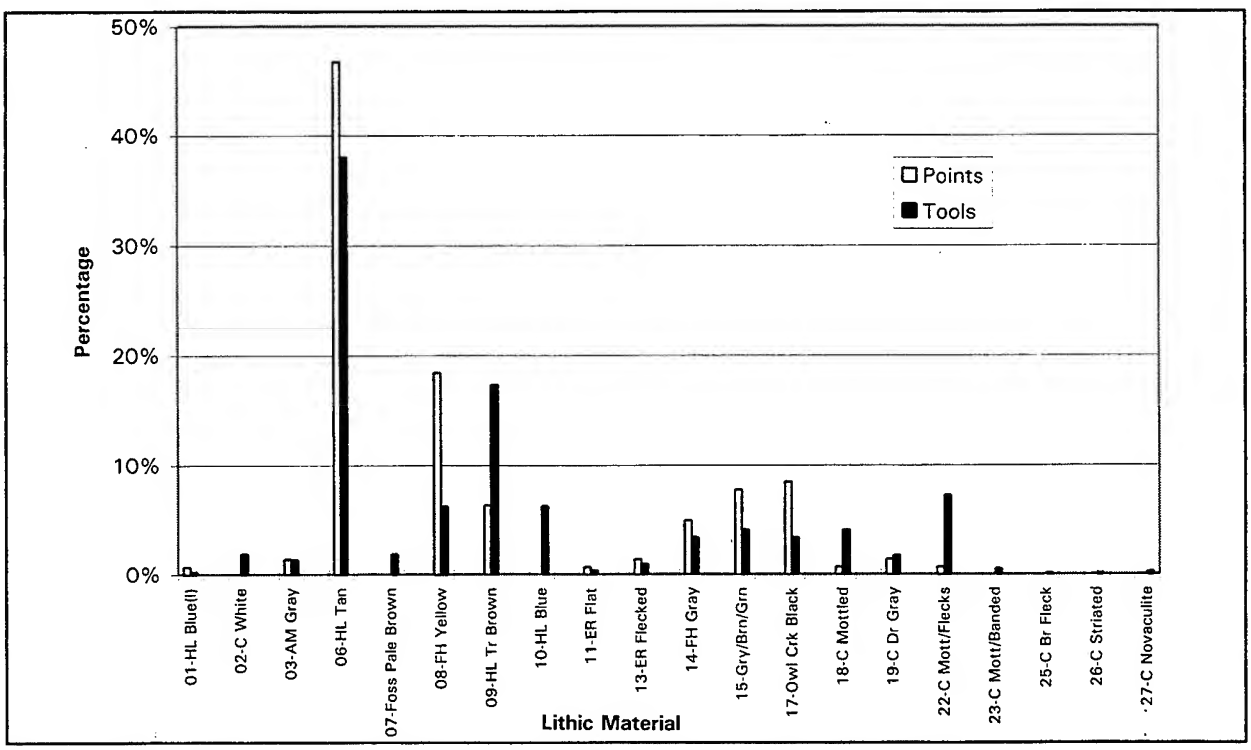


Figure 8.31 Chert Usage of Projectile Points and Other Tools by Chert Type.

The Cowhouse/Taylor/Bear site grouping between Southeast Range and North Fort chert provinces consists of eight projectile points, three Early Archaic points, and four Transitional Archaic points. This site grouping follows the general pattern of chert usage; a high use of local cherts with North Fort province material represented by 63% and Cowhouse province bedload materials represented at 13%. Specific chert types Fort Hood Yellow, Fort Hood Gray, and the total Heiner Lake Tan cherts each account for 25% of the total.

The East Cowhouse site grouping consists of only two Late Archaic dart points from site 41BL339. Both are made of nearby Fort Hood Yellow chert.

The North Nolan/Cowhouse site grouping in the Southeast Range province consists of 15 projectile points: one Early Archaic, two Middle Archaic, one Late Archaic, three Transitional Archaic, and six Late Prehistoric arrow points. Southeast Range province material comprises two-thirds the total, all of which are Heiner Lake Tan cherts. North Fort province materials comprise the remaining third, split between Fort Hood Yellow (n=2), Owl Creek Black chert (n=2), and Gray/Brown/Green (n=1).

The North Nolan/South site grouping in the Southeast Range province consists of 24 projectile points, two Paleoindian, one Late Paleoindian (Angostura), four Early Archaic, one Early/Middle Archaic, six Late Archaic, one Late/Transitional Archaic, five Transitional Archaic, one Scallorn and one untyped arrow point. This site grouping again reveals the same general use pattern of local materials dominating and includes a point of bedload Cowhouse materials.

The Shell Mountain site grouping in the northern part of West Fort province consists of 47 projectile points. Two are Early Archaic, ten Middle Archaic, 12 Late Archaic/Transitional Archaic, 9 Transitional Archaic, 5 general Archaic, and five Late Prehistoric arrow points. Although the Shell Mountain site grouping is far removed from the Southeast Range province materials, the chert type frequencies from there are equal to those of the closer North Fort province. This use implies an embedded collection technique. Fort Hood Yellow (27.7%) from North Fort province and Heiner Lake Tan (38%) from the Southeast Range province are only separated by 11 percentage points in their representation. This is significant because the high recovery in projectile points (n=47) of the 57 sites tested, is found in this site grouping.

The Stampede site grouping in the central part of West Fort province contains eight projectile points consisting of two Middle Archaic, one Late Archaic, one Late/Transitional Archaic, and four untyped dart points. Once again the general chert use pattern holds for the Stampede site grouping, with Southeast Range province material contributing 75% of the chert used in the projectile points, all of which are Heiner Lake varieties.

The Table Rock site grouping in central West Fort province contains eight projectile points including one Paleoindian, two Early Archaic, two Early/Middle Archaic, two Transitional Archaic dart points, and one Late Prehistoric arrow point. Although the Table Rock site grouping appears to stray from the general chert use pattern (North Fort 50%, Southeast Range 37%), a difference of one point is not significant.

Twenty-nine projectile points were recovered from the West Cowhouse site grouping in central West Fort province. It is the only grouping to have West Fort province cherts represented (Anderson Mountain Gray). Points include one Early Archaic, four Middle Archaic, three Late Archaic/Transitional Archaic, three general Archaic, three Late Prehistoric arrow, and one indeterminate projectile points. Fifty-nine percent of the cherts are Southeast Range province types with 88% made of Heiner Lake Tan. Fourteen percent of the point materials are Fort Hood Yellow, with all North Fort province materials accounting for 31% of the total.

8.2.1.3 Non-Projectile Point Synthesis

Twenty-seven categories of tools (chipped, ground, and hammer/abrader) and three categories of cores were represented in the stone tool assemblage. In keeping with the "back to basics" approach specified in the Fort Hood research design (Ellis et al. 1994), previously defined and named Texas tool types were not used in favor of functional or technologically descriptive terms (see section 4.3.4).

Since the tools have been combined for a multiple site grouping and are potentially from varied contexts and differing time periods only general statements can be made regarding tasks performed and their meaning. The data are summarized in Table 8.15, and examples are illustrated in Figures 8.32 through 8.41.

The West Cowhouse site grouping has 17 different tool types and two kinds of cores. The ten cores are dominated by nine multiple platform or multidirectional cores and only one flake/blank core. The 124 formal and informal tools reflect tasks involving lithic reduction, vegetal processing (e.g., crushing/abrading tool), wood-working (e.g., adze, gouge, wedge), and hunting and the resultant tasks (bifaces, unifaces, choppers, utilized flakes, etc.). The Shell Mountain site grouping has 17 tool types and one multiple platform core reflecting various tasks performed of a similar nature to that seen in the West Cowhouse site grouping. The Stampede site grouping is different from the previous two groups with the presence of a mano in the assemblage. The remainder of the tool assemblage is limited in number and variety, having only five other tool types. The Table Rock site grouping has 11 tool types, including a mano and metate. The tools represented include both formal and informal varieties. Only one multiple platform core was recovered from the Turkey Run site grouping. A total of 89 tools representing 17 tool types and one core type were recovered from the North Nolan/South site grouping. They represent lithic reduction tasks and both vegetal and animal procurement and processing. The Cowhouse/Taylor/Bear site group is marked by 16 tools of seven types and one multiple platform core. The East Cowhouse site group is represented by slightly more tools than the Cowhouse/Taylor/Bear group having 19 specimens including eight categories and a multiple platform core. The 296 tools recovered from the North Nolan/Cowhouse site grouping are the largest of all the groupings and include 22 categories and two types of cores.

One of the most interesting artifacts recovered is the Waco sinker from site 41BL154 (see Figure 8.32). The inferred function of these stones is one of a fishing weight or as a weight used on a bola. All possible tasks are represented, including vegetal processing/grinding and meat and hide/connective tissue processing.

8.2.1.4 Summary

Heiner Lake Tan chert from the Southeast Range province represents most (52%) of the identifiable projectile point cherts types, while 64% of material types represented in the tool and core assemblage are Southeast Range province materials. It could be hypothesized that the Heiner Lake material has some quality which makes it a preferred choice for projectile point manufacture. Although not as easily seen looking at the uncombined tool category charting, certain non-projectile point tools were made of only certain chert types. However, Heiner Lake Tan and Fort Hood Yellow chert types are used for every tool type regardless of function. It is interesting to note which tool types have greater or lesser varieties of chert. Utilized flakes and untyped unifaces are made of 18 different identifiable chert types, while adzes and wedges, choppers, and drills and gravers, are made of only six chert types. Scrapers, late stage bifaces, early and middle stage bifaces, and preforms (in that order) are made of decreasing numbers of chert types.

Table 8.15 Frequency of Tool Types by Chert Province and Site Group.

		Chert Province							
		West Fort	Southeast Range	North Fort	Cowhouse	Quartzite	Limestone	Sandstone	Grand Total
West Cowhouse Site Group									
Hammer/abrader	crushing/battering	0	0	3	0	0	0	0	3
	hammerstone	0	1	0	0	1	0	0	2
Core	flake/blank	0	1	0	0	0	0	0	1
	multiple platform	0	2	4	3	0	0	0	9
Tool	adze	0	1	0	0	0	0	0	1
	biface	0	0	1	1	0	0	0	2
	chopper	0	1	0	1	0	0	0	2
	complex scraper	0	2	1	1	0	0	0	4
	drill	0	1	0	1	0	0	0	2
	early stage biface	0	2	1	4	0	0	0	7
	end scraper	0	2	0	2	0	0	0	4
	late stage biface	0	5	4	2	0	0	0	11
	middle stage biface	0	5	3	2	0	0	0	10
	other tool	0	1	1	2	0	0	0	4
	preform	0	5	5	2	0	0	0	12
	side scraper	0	4	3	4	0	0	0	11
	uniface	0	15	8	11	0	0	0	34
	utilized flake	0	6	3	2	0	0	0	11
	wedge	0	2	1	1	0	0	0	4
	Subtotal	0	56	38	39	1	0	0	134
Shell Mountain Site Group									
Hammer/abrader	crushing/battering	0	5	0	0	0	0	0	5
Core	multiple platform	0	3	2	2	0	0	0	7
Tool	chopper	0	0	0	1	0	0	0	1
	complex scraper	0	0	0	2	0	0	0	2
	drill	0	1	2	0	0	0	0	3
	early stage biface	0	6	3	1	0	0	0	10
	end scraper	1	5	0	1	0	0	0	7
	graver	0	0	1	0	0	0	0	1
	hammerstone	0	0	0	0	0	2	0	2
	late stage biface	0	20	19	2	0	0	0	41
	middle stage biface	2	11	4	5	0	0	0	22
	other tool	0	1	0	0	0	0	0	1
	preform	1	12	9	0	0	0	0	22
	side scraper	0	4	1	2	0	0	0	7
	uniface	2	17	6	9	0	0	0	34
	utilized flake	0	10	5	0	0	0	0	15
	wedge	0	1	0	2	0	0	0	3
	Subtotal	6	96	52	27	0	2	0	183
Stampede Site Group									
Ground/pecked stone	mano	0	0	0	0	1	0	0	1
Tool	late stage biface	1	0	0	0	0	0	0	1
	middle stage biface	0	0	2	0	0	0	0	2
	side scraper	0	0	1	0	0	0	0	1
	spokeshave	0	0	0	1	0	0	0	1
	uniface	0	0	0	2	0	0	0	2
	Subtotal	1	0	3	3	1	0	0	8

Table 8.15 Continued.

		Chert Province							
		West Fort	Southeast Range	North Fort	Cowhouse	Quartzite	Limestone	Sandstone	Grand Total
Table Rock Site Group									
Ground/pecked stone	mano	0	0	0	0	0	1	0	1
	metate	0	0	0	0	0	1	0	1
Tool	complex scraper	0	0	1	0	0	0	0	1
	early stage biface	0	0	0	1	0	0	0	1
	late stage biface	0	0	3	3	0	0	0	6
	middle stage biface	0	6	2	1	0	0	0	9
	preform	0	0	2	1	0	0	0	3
	side scraper	0	1	0	0	0	0	0	1
	uniface	0	2	0	3	0	0	0	5
	utilized flake	0	0	1	0	0	0	0	1
	wedge	0	0	0	1	0	0	0	1
	Subtotal	0	9	9	10	0	2	0	30
North Nolan/South Site Group									
Ground/pecked stone	metate	0	0	0	0	0	0	1	1
	sinker	0	0	0	0	1	0	0	1
Hammer/abrader	crushing/battering	0	1	0	0	0	0	0	1
	hammerstone	0	0	0	0	1	0	0	1
Core	multiple platform	0	13	0	0	0	0	0	13
	tested cobble	0	1	0	0	0	0	0	1
Tool	chopper	0	6	0	0	0	0	0	6
	combination tool	0	1	0	0	0	0	0	1
	complex scraper	0	2	0	0	0	0	0	2
	drill	0	1	0	0	0	0	0	1
	early stage biface	0	26	2	4	0	0	0	32
	end scraper	0	7	1	1	0	0	0	9
	graver	0	2	0	0	0	0	0	2
	late stage biface	0	31	3	6	0	0	0	40
	middle stage biface	0	27	0	6	0	0	0	33
	other tool	0	2	0	0	0	0	0	2
	preform	0	4	1	1	0	0	0	6
	side scraper	0	3	0	0	0	0	0	3
	uniface	0	47	2	3	0	0	0	52
	utilized flake	1	62	5	8	0	0	0	76
	wedge	0	2	0	1	0	0	0	3
	Subtotal	1	238	14	30	2	0	1	286
Cowhouse/Taylor/Bear Site Group									
Core	multiple platform	0	1	0	1	0	0	0	2
Tool	late stage biface	0	2	0	0	0	0	0	2
	middle stage biface	0	2	0	0	0	0	0	2
	preform	0	2	0	0	0	0	0	2
	side scraper	0	1	0	1	0	0	0	2
	spokeshave	0	0	1	0	0	0	0	1
	uniface	0	2	1	0	0	0	0	3
	utilized flake	0	1	1	0	0	0	0	2
	Subtotal	0	11	3	2	0	0	0	16

Table 8.15 Concluded.

		Chert Province							
		West Fort	Southeast Range	North Fort	Cowhouse	Quartzite	Limestone	Sandstone	Grand Total
East Cowhouse Site Group									
Core	multiple platform		0	2	0	0	0	0	2
Tool	adze		1	0	0	0	0	0	1
	end scraper		0	0	1	0	0	0	1
	graver		1	1	0	0	0	0	2
	late stage biface		2	0	1	0	0	0	3
	preform		0	0	1	0	0	0	1
	side scraper		1	0	0	0	0	0	1
	uniface		2	0	1	0	0	0	3
	utilized flake		3	0	2	0	0	0	5
	Subtotal		10	3	6	0	0	0	19
North Nolan/Cowhouse Site Group									
Hammer/abrader	hammerstone	0	0	0	0	0	1	0	1
Core	multiple platform	0	4	0	0	0	0	0	4
Tool	adze	0	0	0	1	0	0	0	1
	chopper	0	1	0	1	0	0	0	2
	combination tool	0	2	0	0	0	0	0	2
	complex scraper	0	1	0	0	0	0	0	1
	denticulate	0	1	0	0	0	0	0	1
	early stage biface	0	2	1	0	0	0	0	3
	end scraper	0	2	0	0	0	0	0	2
	graver	0	1	0	0	0	0	0	1
	late stage biface	0	14	3	1	0	0	0	18
	middle stage biface	0	2	1	0	0	0	0	3
	other tool	0	1	0	1	0	0	0	2
	preform	0	7	2	0	0	0	0	9
	side scraper	0	4	0	1	0	0	0	5
	uniface	1	17	2	2	0	0	0	22
	utilized flake	0	11	1	0	0	0	0	12
	Subtotal	1	70	10	7	40	1	0	89
Grand Total		9	490	132	124	4	5	1	765

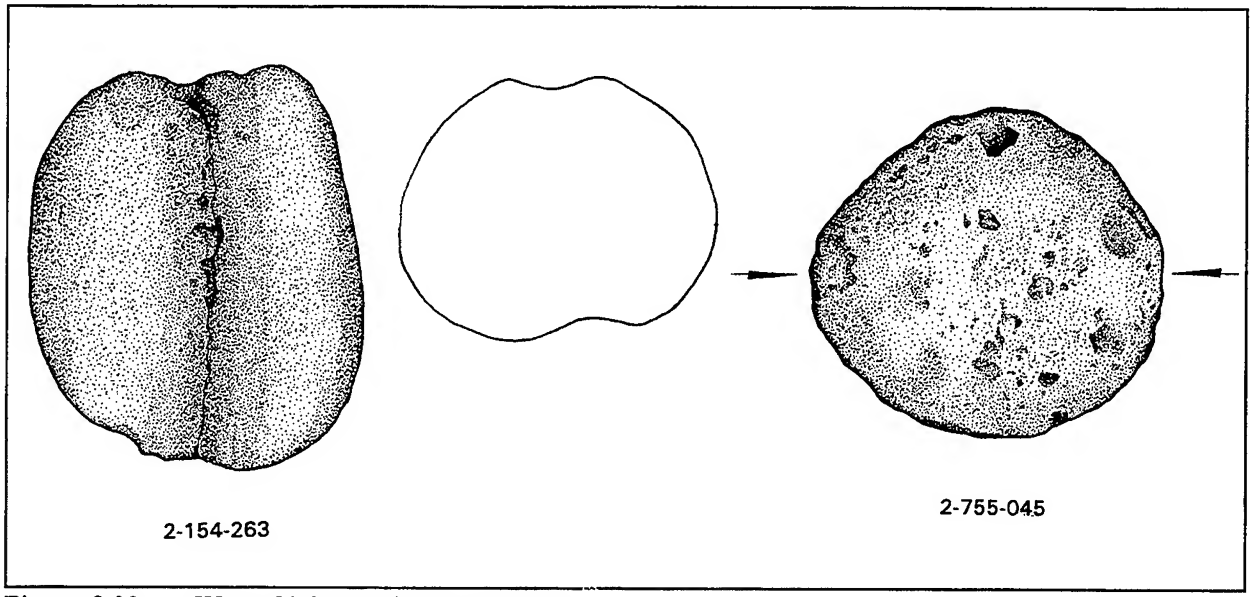


Figure 8.32 Waco Sinker and Hammerstone.

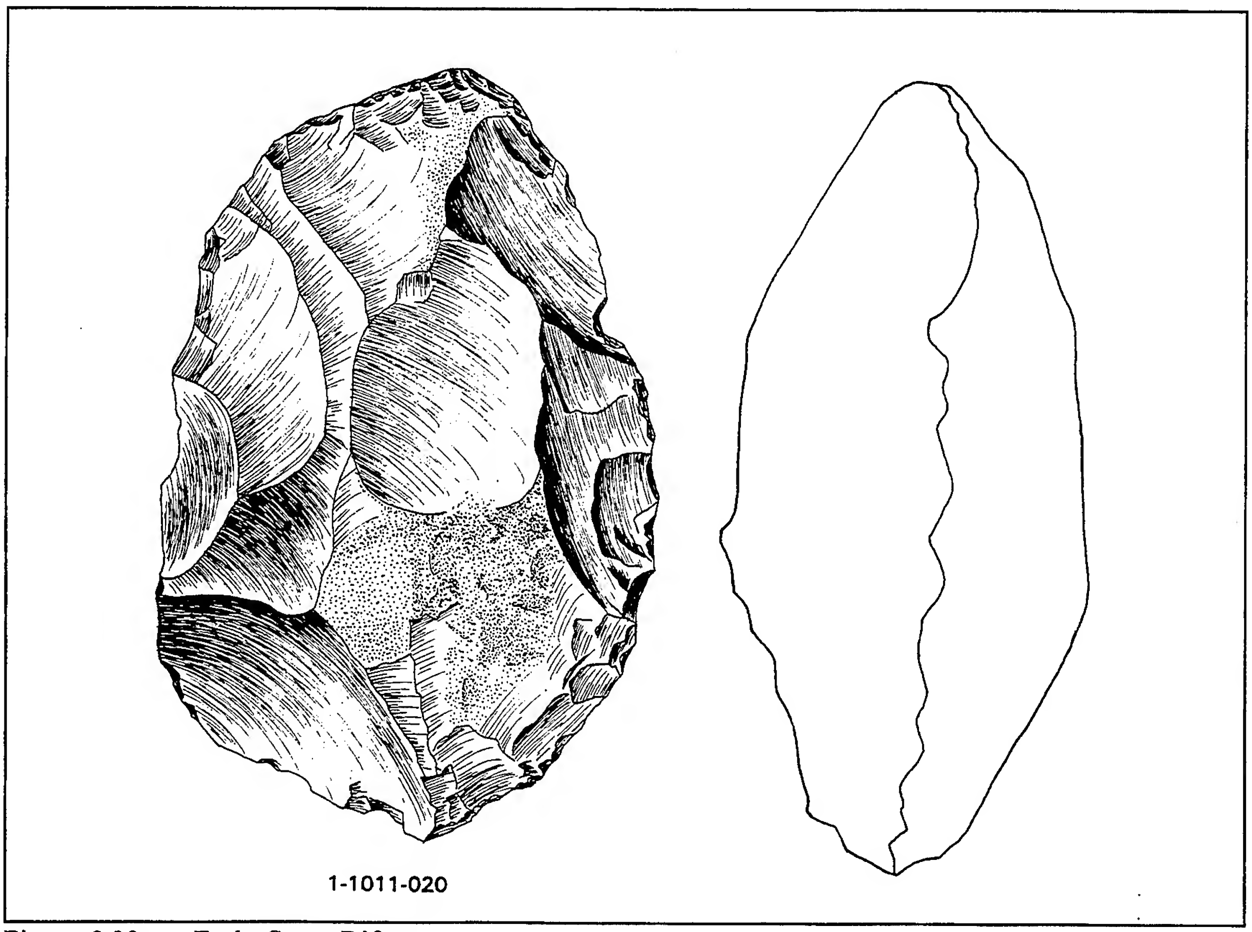


Figure 8.33 Early Stage Biface.

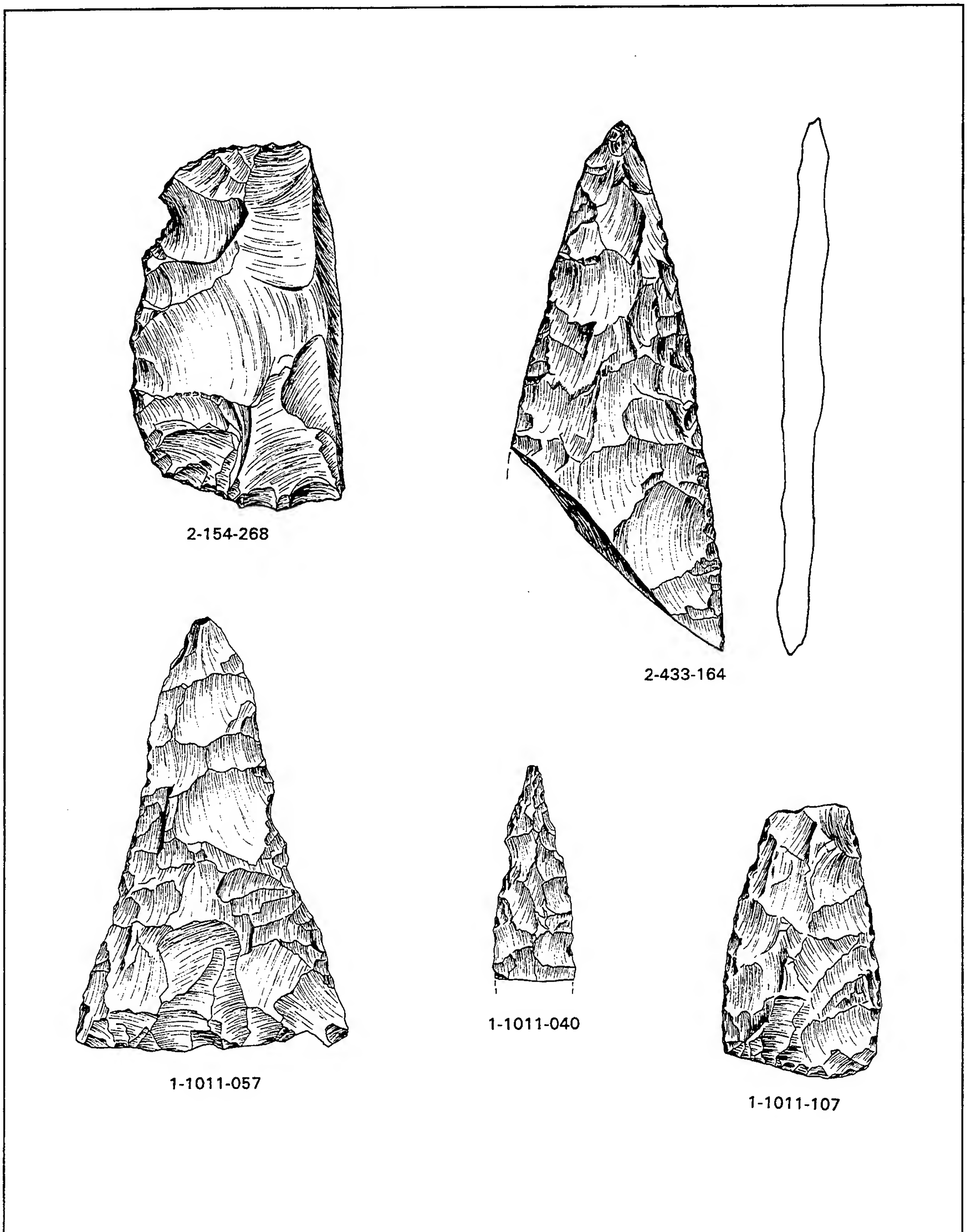


Figure 8.34 Late Stage Bifaces.

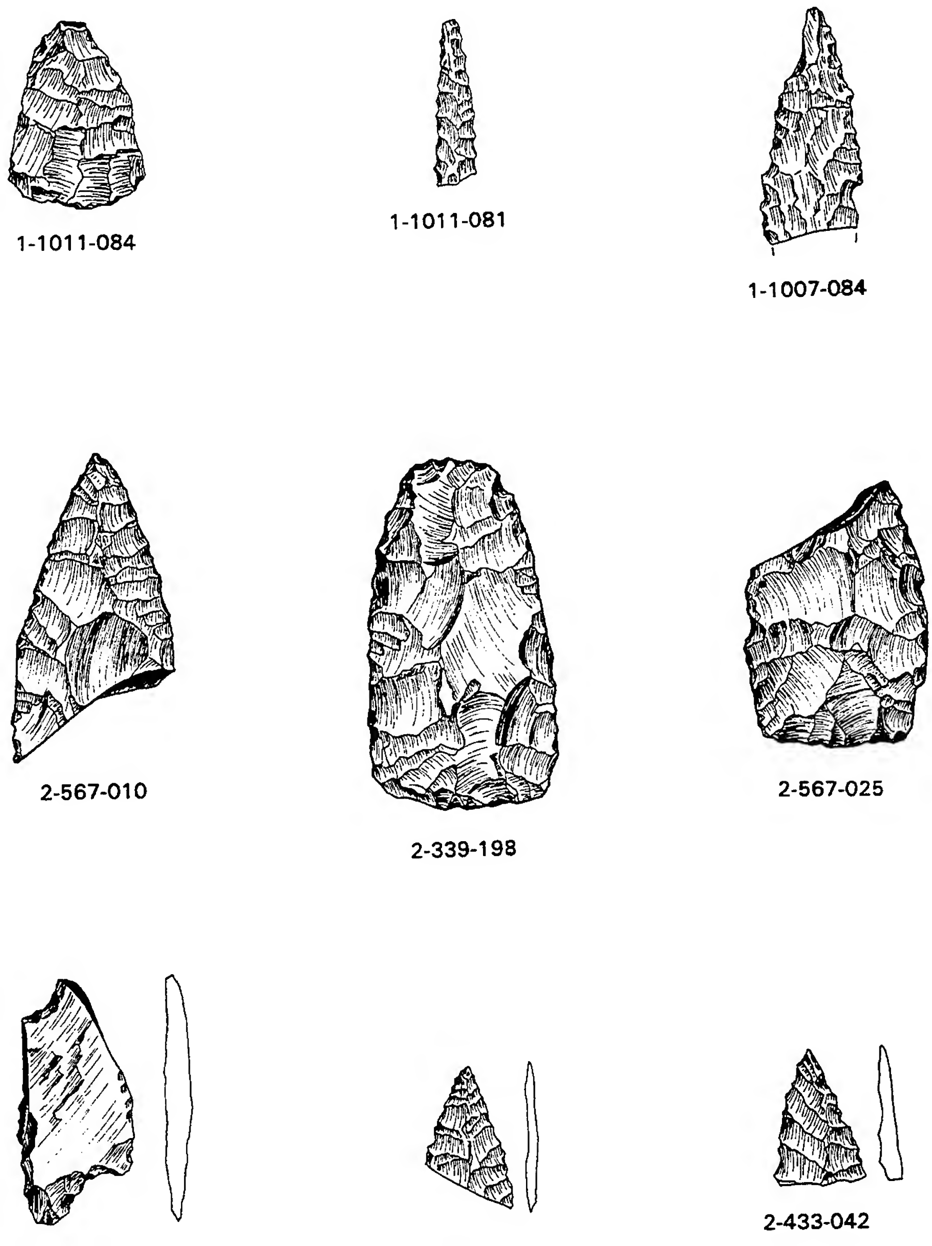
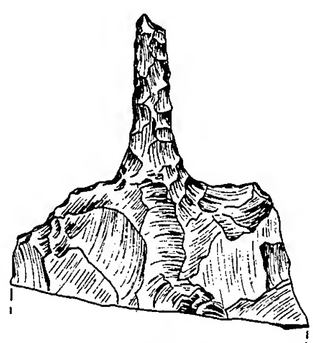


Figure 8.35 Preforms.

1-1007-091



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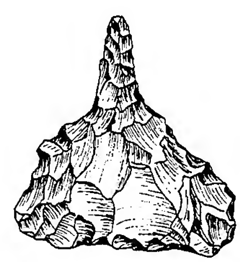

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Figure 8.36 Drills.

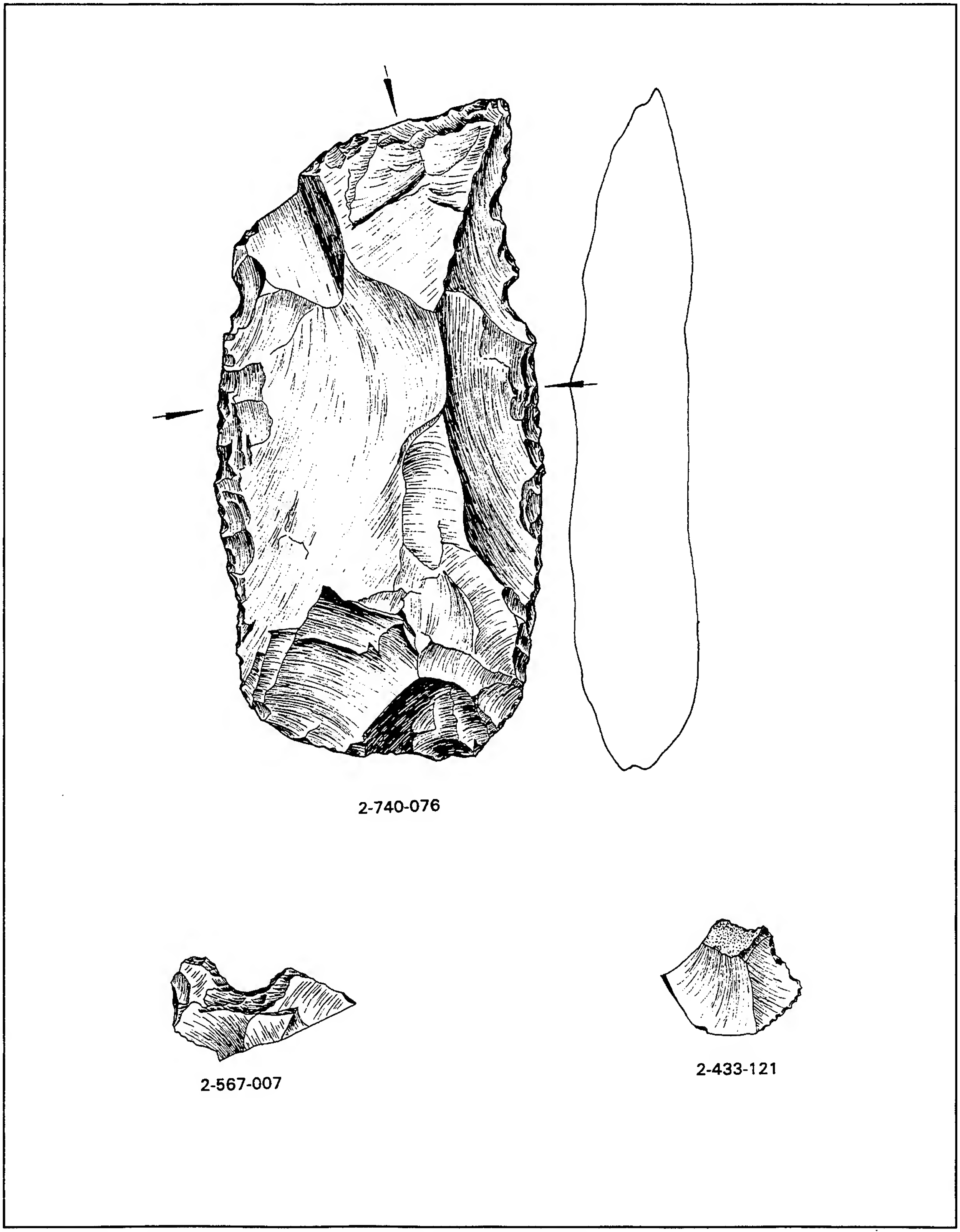


Figure 8.37 Complex Scraper, Spokeshave, and Denticulate.

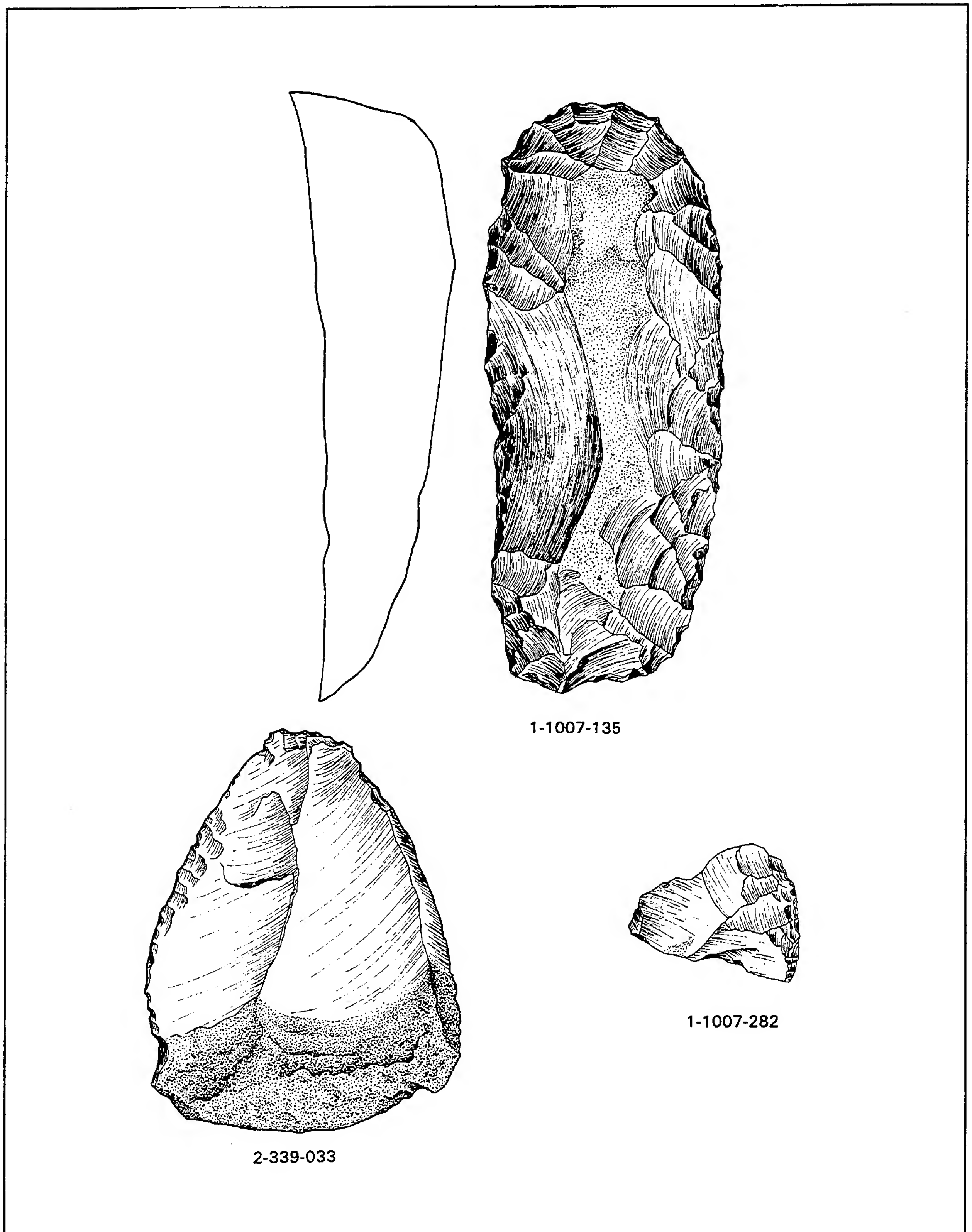
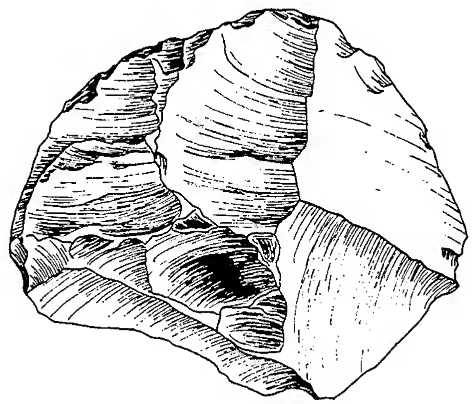


Figure 8.38 End and Side Scrapers.



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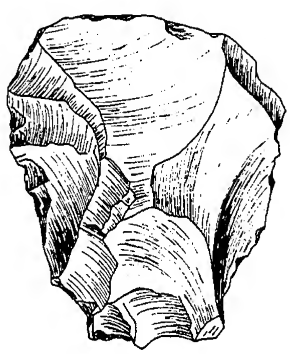

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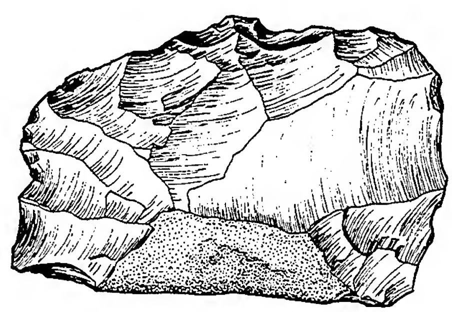

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Figure 8.39 Wedges.

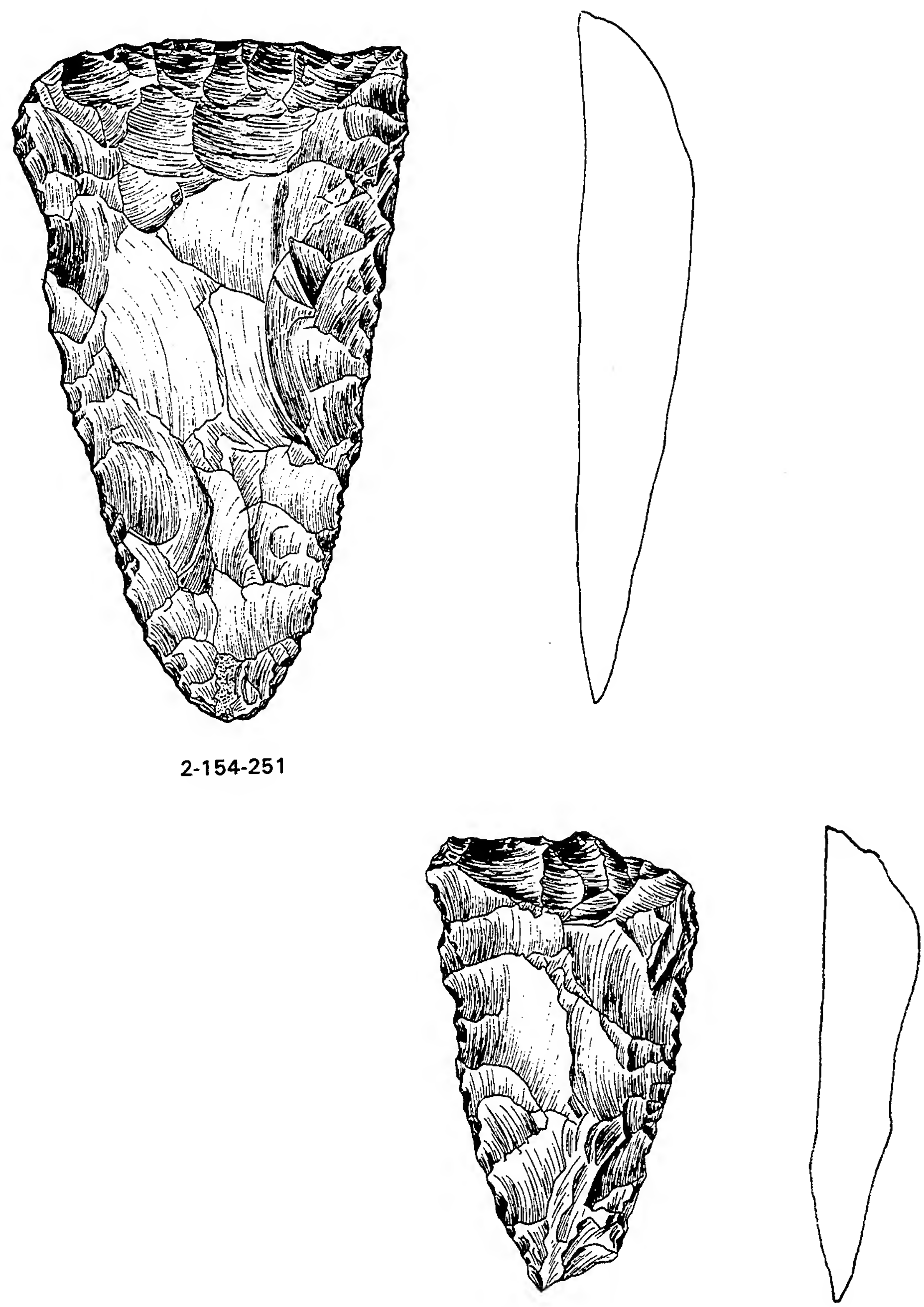

Figure 8.40 Gouges.

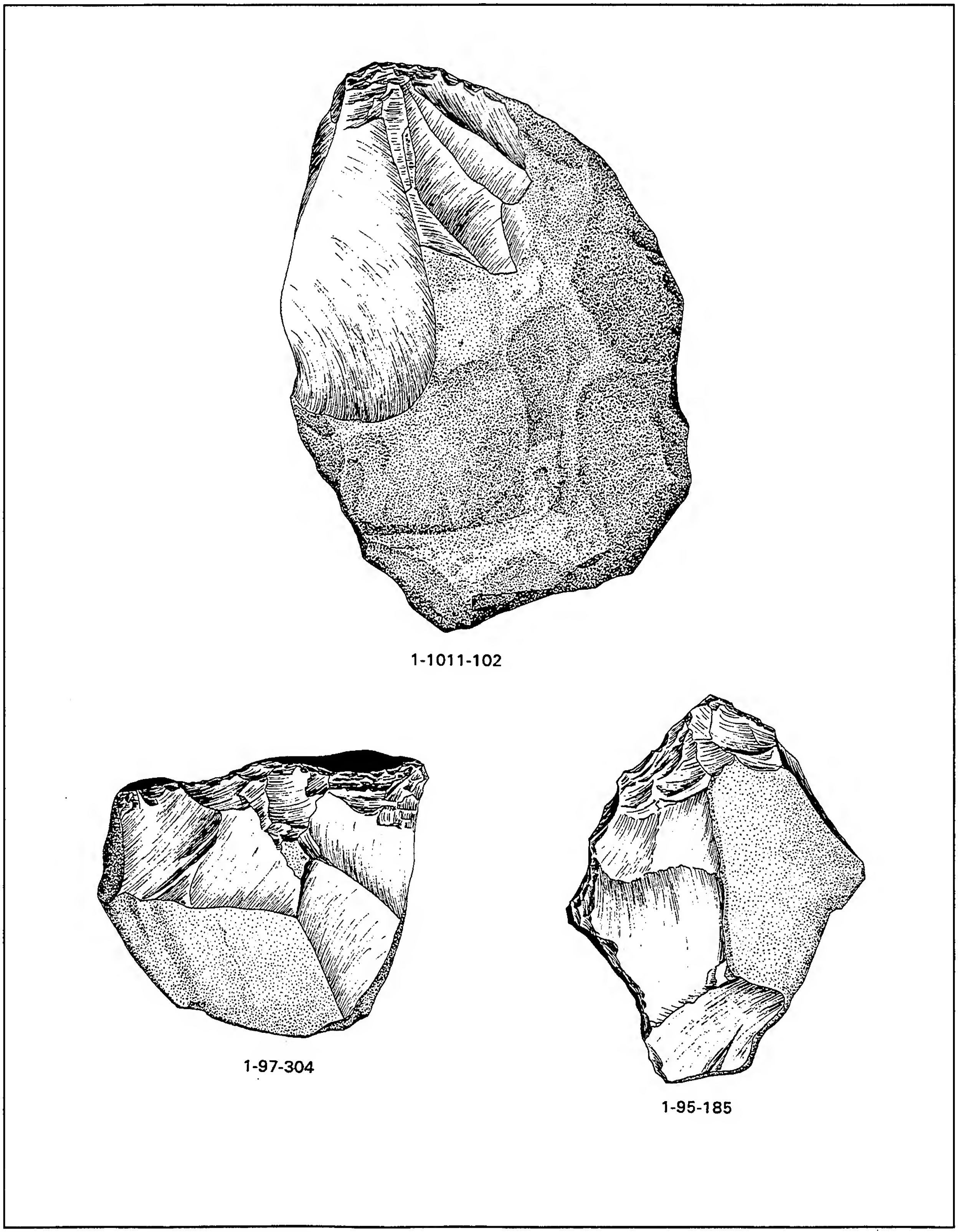

Figure 8.41 Crusher/Batterers.

It would appear on the surface that the requirements for certain tasks: strength and flexibility (elasticity of the material) are characteristics that are taken into account when selecting a raw material. The more inclusive biface category exhibits a requirement for a material that is both easily knappable and also strong enough to withstand exerted pressure. This is especially true if one considers the intended final forms of preforms and late stage bifaces could be dart or arrow points.

An overwhelming majority of the tools are made from Southeast Range cherts (n=454, 64%); North Fort and Cowhouse chert provinces make up nearly equal percentages (n=121, 17.1%; n=119, 16.9%, respectively), while West Fort cherts contribute a minute amount in comparison (n=9; 1.2%). As was noted above certain chert types are used for particular categories of tools. This is clearly seen as not only a preference for a particular chert but also a tendency towards a chert province. Bifaces (all stages), unifaces, scrapers, and preforms are made from all four chert province materials. Adzes and wedges, drill and gravers, and other or combination tools are made from three of the four (West Fort is excluded). Choppers are made from only Southeast Range and Cowhouse materials. One caveat is that the tool type categories reflecting utilization of all four chert provinces also have the highest sample numbers. The combination of the tools and the projectile points factored as percentages of the class is interesting. The material types represented in the tools seem to favor the Southeast Range province more strongly than the materials represented by the projectile points. After accounting for the Southeast Range province materials, the materials represented by the tools are nearly evenly split between the Cowhouse and North Fort province materials; whereas the strong second choice of raw material for projectile point manufacture is from North Fort province. This may have something to do with the nature of the Cowhouse materials. Bedload materials are potentially fraught with internal fractures, and thus not the best materials from which to fashion durable points.

8.2.2 Bone Tools, Ceramics and Historic Artifacts

The testing at the 57 sites also recovered other classes of artifacts. These include the prehistoric ceramics, the bone tools, and small numbers of historic artifacts.

Six sites from two site groups (one east and one west) produced bone tools totaling 11 specimens (Table 8.16). Unlike the majority of the bone tools, these three specimens can be classified as a needle from 41CV1167 and two awls (41BL821 and 41CV137). The majority of the bone tools are ground or slightly polished long bone sections.

Prehistoric ceramics were recovered from three sites in two site groups (Table 8.17), including 53 sherds from site 41CV174 and one sherd each from sites 41CV960 and 41CV1038. Fifty of the 53 sherds from 41CV174 appear to be from a single vessel (catalogue number 1-174-284). Three rim sherds are present, and only three of the 50 sherds could be matched together, forming a partial base/side reconstruction about 7 x 3 cm in size. Based on the rim sherds, the vessel appears to be a jar with an opening diameter of about 3.2 cm, and with a straight to slightly flaring rim profile (Figure 8.42). The vessel shows only slight restriction at the neck. Not enough fits were made to determine lower body shape of the vessel, but it appears to not have been very tall or large. The vessel was recovered from the backdirt of a backhoe trench and field personnel thought they had one whole side of the vessel. The interior shows evidence of scraping utilized to thin the vessel, and the exterior and upper interior rim portion has evidence of polishing/ burnishing. The vessel appears to have been fired at a relatively high temperature. The paste is fine-grained with sand temper and bone evident in both the core of the vessel body and on the surface of both the exterior and interior. The color of the oxidized portions of the vessel is a light orange while the reduced and fireclouded portions range from light tan to gray to black. There is no evidence of intentional decoration unless the

Table 8.16 Bone Tools.

Site No.	Catalog Number	Taxon	Tool Type	Count
41BL154	2-154-299	Mammalia (med/lg)	Indeterminate	1
41BL154	2-154-299	Mammalia	Indeterminate	1
41BL154	2-154-419	Artiodactyla	Indeterminate	1
41BL821	2-821-303	Vertebrata	Awl	1
41BL821	2-821-291	*Odocoileus* sp.	Indeterminate	1
41BL821	2-821-472	Mammalia	Indeterminate	1
41BL886	2-886-178	Vertebrata	Indeterminate	1
41CV97	1-97-1196	Mammalia	Indeterminate	1
41CV137	1-137-327	Mammalia	Awl	1
41CV137	1-137-326	Vertebrata	Indeterminate	1
41CV137	1-137-328	Artiodactyla	Indeterminate	1
41CV587	1-587-031	Mammalia	Indeterminate	1
41CV1167	1-1167-110	Mammalia	Needle	1

Table 8.17 Prehistoric Ceramics.

Site	Catalogue Number	Unit	Sherd Form	Ware	Count
Prehistoric Ceramics Recovered During NRHP Testing					
41CV174	1-174-203	TP 6	body	unknown	2
41CV174	1-174-061	TP 3	body	unknown	1
41CV174	1-174-284	BT 5	base, body and rim	Leon Plain	50(53)
41CV960	1-960-211	TP 5	body	unknown	1
41CV1038	1-1038-167	surface	body	unknown	1
Prehistoric Ceramics Recovered During Shovel Testing Phase					
41BL596	2-596-007	surface	body sherd	incised ware	1
41CV41A	1-41-032	ST 6	rim sherd	incised ware	1
41CV1169	1-1169-013	surface	other	unknown ware	1

polishing/burnishing is viewed as such. The vessel has been dated from adhering soil to be of historic age. The vessel has a basal thickness ranging from 7.74 to 8.08 mm, a postulated mid-body thickness of 4.17 to 6.63 mm, and a rim thickness varying from 3.17 to 3.36 mm. Interior Munsell color was 5YR 6/8, and exterior color ranged from 10YR 7/4 to 7.5YR 6/1. In areas with fire clouds and blackening, the dominant color is 10YR 6/1 and ranges from 2/5YR 4/0 to 2.5YR 3/0.

Three other sherds representing at least two vessels were collected from site 41CV174 (see Table 8.17). These sherds are not similar to the partially

reconstructible vessel in workmanship. However, they are probably of the Leon Plain tradition since petrography found them to be bone and sand-tempered (see Appendix E).

Two other tested sites had recoveries of single sherds each (see Table 8.17). The sherd from 41CV1038 is also of probable Leon Plain origin having sand and bone temper. The sherd from 41CV960 is grog-tempered (Appendix E) and of East Texas Caddoan origin or related tradition. Also, the previous shovel testing phase (Trierweiler 1994) yielded single ceramic sherds from three additional sites. The sherd from 41BL596 was of probable Leon Plain tradition, and that from 41CV41 is a grog-tempered sherd of an East Texas tradition (Appendix E). The sherd from 41CV1169 is of possible Upper Texas origin, possibly related to Goose Creek Plain. Petrography confirmed macroscopic inspection of this sherd as sandy paste.

Finally, 14 sites yielded various historic artifacts, with most of the specimens from one site (41CV587), including a cartridge casing, ceramics, a crown cap, cut and wire nails, and glass of various colors and functions. Because the focus of the current testing phase was exclusively on the prehistoric data content of sites, historic artifacts were noted as evidence of disturbance but were not intentionally collected on a regular basis. For this reason, no meaningful conclusions may be drawn from the historic artifacts.

8.2.3 Diversity of Artifact Assemblages

The diversity and richness of the tool assemblages represented at the sites can be seen in a variety of ways. Inferred function of tools is a method of viewing the types of activities carried out at the site. There is a confinement of grinding implements to three sites with one tool at each. Special purpose tools are seen with the presence of wood-working tools such as wedges, gouges, and adzes, and vegetal processing implements including those above and the addition of the chopper-like crushing/battering tools. Hunting activities and

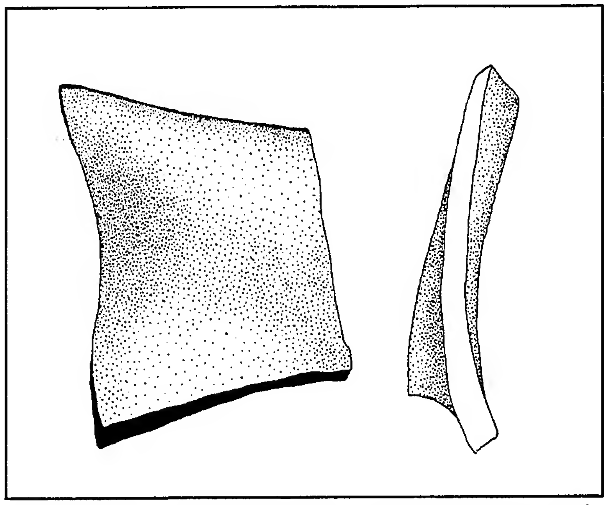

Figure 8.42 Sherd from a Prehistoric Ceramic Vessel Recovered from 41CV174.

their resultant activities had a strong presence in all the assemblages with projectile points and their preforms, as well as end- and side-scrapers. Side- and end-scrapers have vegetal functions as well as hide scraping, and indicate time intensive operations.

Another way of looking at the diversity of an assemblage in arriving at the function of a site is to use statistical measures of evenness, richness and diversity to arrive at comparison data (cf. Jones, Beck and Grayson 1989; Bobrowsky and Ball 1989; Kintigh 1989). Formulas used to calculate these indexes follow Kintigh (1989:29). To this end, several methods were employed to arrive at conclusions or a pattern of usage. The sample sizes for tools vary by site ranging from one tool to a high of 166 with richness values from 1 to 19. A regression analysis of the log 10 transformations of richness plotted against tool sample size results in a polynomial regression of r^2=0.8970 using Microsoft Excel 5.0. There is a strong linear relationship between richness and sample size when viewed as scattergram plots of the log 10 values of each attribute. However, several sites fall outside of the one standard deviation range and can be considered outliers (Table 8.18). Richness and evenness calculations

are independent measures which can be combined to create a diversity index. The scattergram plot of the diversity index by the log 10 of the sample size arrives at similar relationships to that between richness and sample size with a r^2=0.75702 (Table 8.19). Sixteen sites were found to be outliers of the linear relationship; two of these sites were not among those found to lie outside the expected values for diversity. However, an additional three sites are considered significantly different from the others. This suggests that although the number of tool categories for sites 41BL415 and 41CV1023 is higher or lower than expected, the variety of tools falls within the expected ranges. Conversely, sites 41BL208, 41BL740, and 41CV137 are within the expected ranges of tool categories, but the variety of tools or diversity is higher or lower than expected.

To further explore the issue of diversity present in the tool assemblage, a site level diversity index was calculated using super selected classes of artifacts (excluding snail, flotation, and other micro-recovery). As the first step the richness index was plotted against the log 10 of the sample size. Although the regression indicates a high correlation (r^2 =.6672), the number of outliers on this scattergram are of note. Nineteen (39%) of 49 sites are greater than one standard deviation away from the regression line. These sites compare favorably with those lithic assemblages considered outliers. The scattergram plot and regression of the diversity index to log 10 of the sample size indicates no relationship (r^2 =.0035). This leaves little doubt that behavior is having an effect on the artifact assemblage. To shed light on the conditioning factors that might be influencing the assemblage, richness and diversity indexes were calculated for the types and counts of features.

In order to understand and possibly explain the reasons for the outliers, three factors were considered:

(1) Did the volume excavated have advantageous effects? If so, then the sites with the largest volume excavated should be the outliers for all three calculations: lithic tools, site assemblages, and features. Although the sites with the greatest excavated volume appear in the list of outliers, this does not seem to be a dominating effect.

(2) Does the number or type of features contributing materials unfairly influence the richness and diversity indexes? If so, the sites with the greatest number of features or a particular set of features should be the outliers. As Table 8.20 shows, the highest correlation between feature type and uniqueness of the lithic figures are the burned rock concentration and burned rock midden categories at 39% and 50%. Additionally, combining all hearths into

Table 8.18 Residuals for Plot of Log 10 Transformed Richness and Sample Size for Tool Outliers.

	Richness		
Site	Code	Y value	Residual
41BL198	3	0.47712	-0.23667
41BL339	5	1.00000	0.15344
41BL415	6	0.30102	-0.17165
41BL470	8	0.60205	0.18568
41BL751	17	0.95424	0.22174
41BL754	18	1.00000	0.19043
41BL765	20	0.69897	0.18027
41BL821	21	1.23044	-0.16671
41BL853	23	0.00000	-0.24146
41CV1023	28	0.77815	0.15714
41CV1027	29	0.30102	-0.290256
41CV1038	30	1.00000	0.190437
41CV1136	35	0.90308	0.15317
41CV1423	40	0.69897	0.18027
41CV164	41	0.00000	-0.34378
41CV95	46	1.14612	0.2478

r^2 = 0.8723
Standard deviation = .13883

a single type results in a 44.4% rate of occurrence. The comparison of the tool, site assemblage, and feature richness and diversity indexes resulted in three sites determined to be outliers in all three categories. Ten sites are outliers in either lithic tools/features, lithic tools/site assemblages, or features/site assemblages (Table 8.21).

(3) Is the reason for a site being an outlier beyond our recognition at this point of investigation? If so, are these sites recommended for protection/data recovery? There is a high correlation between the sites found to be outliers in all three categories, and NRHP eligibility. Of 33 sites with richness and diversity figures outside the linear relationship, only six (18%) are not considered eligible.

It appears that the explanations vary by particular suites of sites and can not be explained by one interpretation. It is very likely that the combination of features and lithic assemblages work in tandem to produce sites with site assemblages that fall outside of the predicted realm. Since the richness of site assemblages is closely related to total numbers of artifacts recovered and the diversity is non-linear in nature, this statistic can not be used to determine whether or not the site is eligible. However, the richness and diversity figures can be used to validate other measures of eligibility and can also indicate areas of further investigation for research purposes. Potentially large-scale excavation will produce explanation(s).

Table 8.19 Residuals for Plot of Diversity Index and Log 10 Transformed Sample Size.

	Richness		
Site	Code	Y value	Residual
41BL198	3	0.4180	-0.216329
41BL208	4	0.6788	-0.208026
41BL339	5	0.9440	0.22245
41BL470	8	0.6021	0.21566
41BL740	17	0.9561	0.16713
41BL751	17	0.8719	0.2392
41BL754	18	0.9125	0.21977
41BL765	20	0.6778	0.21166
41BL821	21	0.8736	-0.27687
41BL853	23	0.0000	-0.25017
41CV1027	29	0.2442	-0.27848
41CV1038	30	0.8943	0.20157
41CV1136	35	0.8648	0.21854
41CV137	38	0.8188	-0.25044
41CV1423	40	0.6778	0.21166
41CV164	41	0.0000	-0.32988
41CV95	46	1.0478	0.28599

$r^2 = 0.75702$
Standard deviation = 0.16021

Table 8.20 Number and Type of Features.

		Feature Type																				
Site Group	Site No.	nnular BR mound	sh & charcoal stains	as-shap hearth no rock	asin hearth, slab lined	asin-shaped w/rock	urials	BR & shell midden	BR concent	BR midden	BR pavement	aches	ispersed hearth	omed BR mound	earth ang rock	earth no rock	earth, lit no rock	ussel shell midden	atural feature	ost mold	lab lined hearth	andal feature	Grand Total
Cowhouse/Taylor/Bear	41BL513	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	41BL538	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
	41BL564	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	41BL567	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
	41BL568	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
	Subtotal	1	0	0	0	0	0	0	0	1	0	0	0	2	1	0	1	0	0	0	1	0	7
East Cowhouse	41BL339	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	4
	41BL415	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Subtotal	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	5
North Nolan/Cowhouse	41BL198	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	41BL743	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	41BL744	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	41BL751	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	41BL755	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	41BL888	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
	Subtotal	2	0	0	0	0	1	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	8
North Nolan/South	41BL154	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	3
	41BL208	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	41BL740	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
	41BL821	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	Subtotal	0	0	0	0	0	0	0	1	4	0	1	0	0	1	0	0	0	0	0	0	0	7
Shell Mountain	41CV1007	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2
	41CV1085	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	41CV1167	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	2
	41CV137	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	3
	41CV587	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
	Subtotal	0	0	1	0	1	0	0	1	5	0	0	0	0	0	0	0	0	0	1	0	1	10
Stampede	41CV1023	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	3
	41CV1027	1	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	4
	41CV595	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
	Subtotal	1	0	0	0	1	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	9
Table Rock	41CV1136	0	0	0	1	0	0	0	2	1	1	0	0	0	1	0	0	0	0	0	0	0	6
	41CV1423	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	2
	41CV174	0	0	0	4	2	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	9
	41CV319	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2
	Subtotal	0	0	0	5	2	0	0	5	4	1	0	0	1	1	0	0	0	0	0	0	0	19
Turkey Run	41CV1391	0	0	0	1	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	4
West Cowhouse	41CV1038	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4
	41CV1098	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	41CV1105	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	41CV1200	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	3
	41CV95	0	0	0	0	1	0	0	2	1	0	0	0	0	3	0	0	0	0	0	1	0	8
	41CV960	0	0	0	0	1	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	4
	41CV97	0	1	3	1	3	0	1	3	3	3	0	1	0	3	1	0	0	1	0	0	0	24
	Subtotal	0	1	3	1	11	0	1	9	6	3	0	1	0	7	1	1	0	1	0	1	0	47
Grand Total		4	1	4	8	16	1	1	21	31	4	1	1	4	10	1	2	1	1	1	2	1	116

Table 8.21 Comparison of Richness and Diversity Indices for Tools, Site Assemblages, and Features.

	Lithic Tools		Site Assemblages		Feature	
Site	Richness	Diversity	Richness	Diversity	Richness	Diversity
41BL154	-	-	X	-	-	X
41BL168	-	-	X	-	-	-
41BL198	X	X	-	-	X	X
41BL208	-	X	X	-	-	-
41BL339	X	X	-	-	-	X
41BL415	X	-	-	-	-	-
41BL433	-	-	X	-	-	-
41BL470	X	X	X	-	-	-
41BL513	-	-	X	-	-	-
41BL532	-	-	-	-	-	-
41BL538	-	-	-	-	-	-
41BL564	-	-	-	-	-	-
41BL567	-	-	-	-	-	-
41BL568	-	-	-	-	X	X
41BL740	-	X	X	-	X	X
41BL743	-	-	X	-	-	-
41BL744	-	-	X	-	-	-
41BL751	X	X	X	-	-	-
41BL754	X	X	-	-	-	-
41BL755	-	-	-	-	-	-
41BL765	X	X	-	-	-	-
41BL821	X	X	-	-	-	-
41BL834	-	-	X	-	-	-
41BL853	X	X	-	-	-	-
41BL886	-	-	-	-	-	-
41BL888	-	-	-	-	X	X
41CV95	X	X	X	-	-	-
41CV97	-	-	-	-	X	-
41CV137	-	X	-	-	X	X
41CV164	X	X	-	-	-	-
41CV174	-	-	-	-	X	X
41CV319	-	-	-	-	-	-
41CV587	-	-	-	-	-	-
41CV595	-	-	X	-	X	X
41CV960	-	-	-	-	-	-
41CV1007	-	-	-	-	-	-
41CV1011	-	-	-	-	-	-
41CV1023	X	-	X	-	-	-
41CV1027	X	X	-	-	-	X
41CV1038	X	X	X	-	-	X
41CV1085	-	-	-	-	-	-
41CV1098	-	-	X	-	-	-
41CV1105	-	-	-	-	-	-
41CV1116	-	-	-	-	-	-
41CV1136	X	X	X	-	-	X
41CV1167	-	-	X	-	-	-
41CV1200	-	-	-	-	-	X
41CV1391	-	-	-	-	-	-
41CV1423	X	X	X	-	-	-

9.0 OTHER ANALYSES

Karl Kleinbach, Gemma Mehalchick, James T. Abbott, and J. Michael Quigg

In this chapter we continue the substantive intersite analyses begun in the previous chapter. These analyses are performed using the procedures, definitions, and typologies we have described in Chapter 4.0 and using the final electronic database presented (on microfiche) in Appendix C. In section 9.1, we discuss the variability of features found on the 57 sites, with heavy emphasis on burned rock features, and we draw some substantive conclusions about feature construction and use. Next, section 9.2 presents further research on the chronometric applications of landsnails at Fort Hood. The final two sections pursue our previous research on sites situated in deposits on Paluxy sand (9.3), and at Fort Hood's numerous rockshelters (9.4)

9.1 INVESTIGATED FEATURES

This section addresses the cultural features investigated on Fort Hood during NRHP eligibility testing of 57 prehistoric sites. Although additional features were noted on a number of sites, only those features that were located in, or investigated by, an excavation unit are addressed in the following discussion.

The term "feature" is used in a number of different senses in archeology, and it is therefore a difficult term to define in a precise, encompassing way. Champion (1980) defines an archeological feature as "any constituent of an archeological site which is not classed as a find or small find." This definition is at once quintessentially British and wholly unsatisfying, in that it encompasses the entire site matrix. Alternatively, the term can be intentionally divorced from any cultural connotation and defined as "any of the various units selected by the archeologist for excavation" (Dittert and Wendorf 1963:19), but this is both vague and not consistent with established usage, which clearly denotes a cultural origin or association. In the broadest sense, an archeological feature is probably best viewed as a non-portable cultural manifestation (Heizer 1958; Fladmark 1978); it is an artifact that is such an integral part of the site matrix that it cannot be readily dug up, cataloged, and stored in a depository. This definition is similar to the one in Trierweiler (1994:Appendix E), which states that "features are nonportable objects, object clusters, or sediment anomalies which are most often attributed to fairly discrete cultural behaviors."

One of the most useful aspects of the term "feature" is that it can be used to identify both intentional and unintentional by-products of cultural activity, or even natural anomalies occurring in a site's matrix; thus, both a well-defined hearth and a vague, amorphous stain of unknown origin can be encompassed by the same term. The designation can be further utilized to distinguish distinct or outstanding subsets of the initially identified feature (e.g., an internal hearth in a larger burned rock feature, a stain, or postmold discovered on a house floor). Moreover, it can be used to designate a collection of artifacts with spatial interrelationships that either suggest intentional placement (e.g., a lithic cache or a carefully arranged stack of bones) or a discrete activity (e.g., a semi-circular scatter of flakes indicative of a knapping station or an alignment of bone pegs used to pin down animal hides). Note that while the entire contents of the feature (including the matrix) may be excavated and taken back to the laboratory, the feature itself is destroyed in the process of examination.

The following discussion draws heavily on a typology of features developed previously (Trierweiler 1994:Appendix E). The terms in this typology are presented graphically in Figure 9.1, organized according to type and material. One type--diffuse burned rock scatters--originally defined as a feature type were not treated as such during the testing investigations because 1) scattered burned rock is nearly ubiquitous on

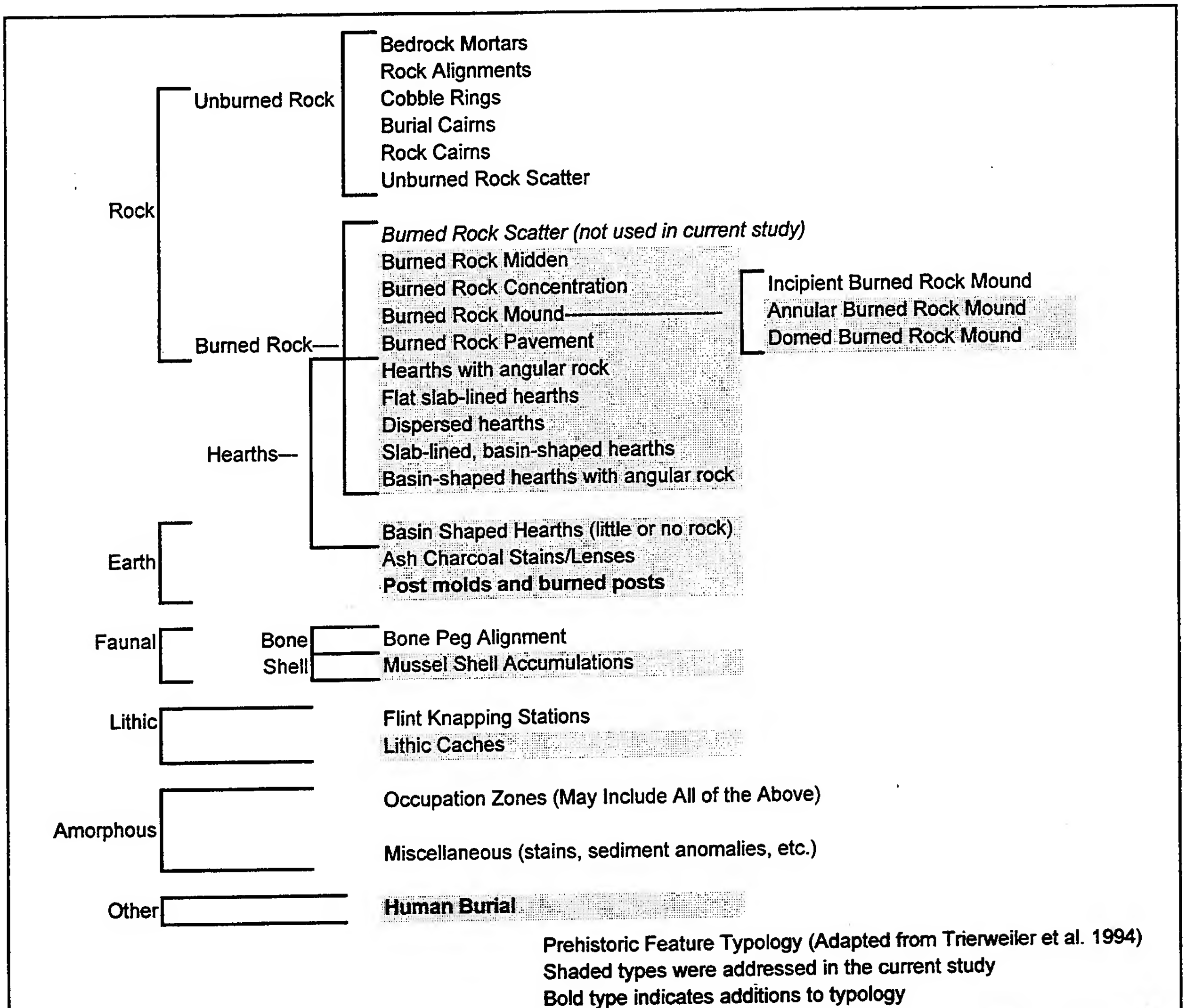

Figure 9.1 Prehistoric Feature Typology.

archeological sites on Fort Hood, and 2) scatters typically appears to reflect natural disturbance of a site rather than a direct result of human activity. Two additional feature types have been added to the list: (1) human burial and (2) post molds and burned posts. Not all of the feature types in the typology were identified at the 57 sites addressed in this study; those types that were encountered are indicated by shading in the figure and are addressed below. For definitions of the feature types that were not encountered, see Trierweiler (1994).

Investigation of burned rock features has been a primary focus of Central Texas archeology for more than 70 years. This scrutiny is not unwarranted, because with the exception of stray projectile points and frequently ubiquitous scatters of lithic debitage, burned rock features form the most obvious and pervasive type of prehistoric cultural manifestation in the region. Unsurprisingly, the majority of features investigated at the 57 sites addressed in the current study were composed of burned rock, and the following discussion therefore emphasizes them. In addition, a number of hearth features largely

lacking rock were also discovered. Finally, a small number of non-burned rock feature types were discovered, including two lithic tool caches, a mussel shell midden, a carbonized post, and a human burial. Each type is discussed below.

9.1.1 Burned Rock Mounds, Middens, Concentrations, and Pavements

The burned rock features encountered during this testing phase were separated into the following categories: mounds, middens, concentrations, pavements, and hearths. These categories were based primarily on morphology and associated cultural remains, and are defined below. However, as Figure 9.1 indicates, not all hearth features include burned rock. For this reason, discrete hearths are treated separately in section 9.1.2, and the following discussion is limited to mounds, middens, concentrations, and pavements. Table 9.1 presents basic dimensions and environmental settings of the examples of the features that were addressed on the 57 sites.

The investigation of large burned rock features has a long history in Central Texas, and has given rise to a large and somewhat confusing body of literature. Much of the confusion is the result of inconsistent usage of the terms "burned rock mound" and "burned rock midden," which is intimately tied to the evolution of theoretical perspectives on the features. The basic subdivision between features termed "burned rock mound" and "burned rock midden" used in this report is somewhat at odds with current usage in Central Texas archeology. In short, we draw a distinction between "mounds" and "middens," while general usage tends to treat the two terms synonymously. For this reason, it is necessary to preface the discussion of burned rock features that follows with a summary of the historical evolution of the terms in order to provide context for our break with the prevailing usage.

9.1.1.1 An Historical Context for the Discussion of Burned Rock Features

Evolution of Basic Terminology

The mound/midden terminological problem reaches back to the early 1900s, when J. E. Pearce interpreted the accumulations of burned limestone that dot the Central Texas landscape as "kitchen middens," or accumulations of waste resulting from cooking activities (Pearce, 1919:230). Although this broad interpretation was generally accepted, subsequent reports on these features in the early to mid 1900s (eg. Sayles 1929; Wilson 1930; Huskey 1935; Jackson 1937; Kelly and Campbell 1942) commonly refer to these features using the more neutral morphological descriptor "burned rock mounds" rather than interpretive descriptor "burned rock midden." In fact, even though Pearce continued to believe in his functional interpretation, he too acquiesced to the use of the morphological term (Pearce 1932).

In a 1945 discussion of terms in the *Bulletin of the Texas Archeological and Paleontological Society* (1945:41-51), Alex Kreiger made a pivotal statement that has influenced the terminology applied to these features ever since. While recognizing that prior usage of the term "mound" in the Texas literature encompassed every kind of heaped accumulation of cultural material that rose above ground level, such as shell mounds, burned rock mounds, refuse piles, and burial mounds, Kreiger argued that a distinction should be made between purposefully constructed features, like the burial mounds and house mounds in the Caddo area, and features that resulted from an incidental accumulation of cultural debris, such as burned rock mounds presumably represent. On this basis, Krieger argued that the term "mound" should be reserved for intentionally constructed features like the Caddoan burial mounds and earth platforms, thereby setting the stage for the almost universal adoption of the term "burned rock midden."

Following Kreiger's lead, Suhm et al. (1954) again suggested that accumulations of burned rock that

Table 9.1 Dimensions and Environmental Settings of Burned Rock Features.

Site	Feature #	Type	Estimated Size (m)	Test Unit	Depth (cmbs)	Topographic Setting	Location	Comments
41BL154	1	BR Midden	150 x 50	1, 3	10-110, 0-70	Toeslope	North Nolan Creek valley	Spring on Site, 2 Rockshelters on Site
	3	BR Concentration	not estimated	4	125-137	T1	North Nolan Creek valley	Spring on Site, 2 Rockshelters on Site
41BL198	1	Annular BR Mound	12 x 12	1	0-90	Upland	South of Cowhouse Creek	Modified Bedrock Depression, 1 Rockshelter on Site
	2	Annular BR Mound	9 x 9	2	0-50	Upland	South of Cowhouse Creek	Modified Bedrock Depression, 1 Rockshelter on Site
41BL339	4	BR Midden	not estimated	4	140-170	T1B; in slough	Cowhouse Creek valley	
41BL415	2	BR Concentration	0.74 x 0.56	4	19-26	Pleistocene Terrace	Cowhouse Creek	
41BL564	1	Annular BR Mound	12 x 12	2	0-90	Upland	East of Taylor Branch	2 Rockshelters on Site
41BL568	1	Domed BR Mound	13 x 13	3	0-140	Upland	East of Taylor Branch	11 Rockshelters on Site
	2	Domed BR Mound	11 x 11	4	0-80	Upland	East of Taylor Branch	11 Rockshelters on Site
41BL740	1	BR Midden	80 x 20	2	0-35	Toeslope	Trib. of North Nolan Creek	Spring on Site, Sinkhole on Site
	2	BR Midden	not estimated	5	20-50	Toeslope	Trib. of North Nolan Creek	Spring on Site, Sinkhole on Site
41BL743	1	Domed BR Mound	10 x 10	1	0-53	Upland	South of Cowhouse Creek	Modified Bedrock Depression
41BL751	1	BR Midden	60 x 20	1	10-100	T1; abuts Toeslope	Near Head of a Side Drainage	
41BL755	1	BR Midden	40 x 12	2	20-53	T1; abuts Toeslope	Near Head of a Side Drainage	
41BL821	1	BR Midden	75 x 30	1, 2	0-70, 0-190	T1; up onto Colluvial Slope	Trib. of North Nolan Creek	Spring on Site
41BL888	1	BR Midden	60 x 50	1, 3	30-60, 60-100	T1; abuts Toeslope	Trib. of Oak Branch	Spring on Site
	2	BR Midden	not estimated	4	0-108	T1	Trib. of Oak Branch	Spring on Site
41CV95	1	BR Concentration	15 x 15	1	surface only	T1	Cowhouse Creek terrace	
	2	BR Concentration	20 x 20	BT 3	surface only	T1	Cowhouse Creek terrace	
	6	BR Concentration	not estimated	5	91-97	T1	Cowhouse Creek terrace	
	8	BR Midden	not estimated	2	20-66	T1	Cowhouse Creek terrace	
	9	BR Concentration	1 x 0.6	5	139-155	T1	Cowhouse Creek terrace	

Table 9.1 Continued.

Site	Feature #	Type	Estimated Size (m)	Test Unit	Depth (cmbs)	Topographic Setting	Location	Comments
41CV97	1	BR Midden	not estimated	5	20-52	T1; base of Toeslope	Cowhouse Creek terrace	
	2	BR Midden	not estimated	4	0-230	T1; near base of Toeslope	Cowhouse Creek terrace	
	2B	BR Pavement	not estimated	4	100-117	internal feature in F2	Cowhouse Creek terrace	
	3	BR Midden	not estimated	1	82-135	Toeslope	Cowhouse Creek terrace	
	3A	BR Pavement	not estimated	1	110-115	internal feature in F3	Cowhouse Creek terrace	
	3B	BR Pavement	not estimated	1	122-133	internal feature in F3	Cowhouse Creek terrace	
	6	BR Concentration	not estimated	8	22-38	T1A	Cowhouse Creek terrace	
	8	BR Concentration	not estimated	8	68-76	T1A	Cowhouse Creek terrace	
	14	BR Concentration	not estimated	10	258-272	T1B	Cowhouse Creek terrace	
41CV137	1	BR Midden	50 x 50	1, 2	80-120, 0-120	T1; up a Colluvial Slope	Trib. of Henson Creek	Spring on Site
	3	BR Midden	not estimated	2	122-147	T1	Trib. of Henson Creek	Spring on Site
41CV174	1	BR Midden	110 x 50	5	20-95	T1B; on to Toeslope	Table Rock Creek	
	6	BR Midden	not estimated	7	60-130	Toeslope	Table Rock Creek	
	9	BR Concentration	not estimated	6	50-80	T1B	Table Rock Creek	
41CV319	1	BR Midden	16 x 12	2, 3, 4	0-30, 0-110, 0-80	Upland; Paluxy Sand	Cowhouse/Table Rock Interfluve	
	2	BR Concentration	4 x not estimated	1	0-20	Upland; Paluxy Sand	Cowhouse/Table Rock Interfluve	
41CV587	1	BR Midden	100 x 50	1, 4	0-110, 70-130	T1; abuts Toeslope	Head of Two Year Old Creek	Spring on Site
41CV595	1	BR Midden	20 x 10	1	10-100	Upland; Paluxy Sand	Above Stampede Creek	
	2	BR Midden	22 x 15	2, 3	0-70, 0-70	Upland; Paluxy Sand	Above Stampede Creek	
41CV960	3	BR Midden	35 x 20	4	0-68	T1	Cowhouse Creek	
	4	BR Midden	35 x 10	2	0-60	T1	Cowhouse Creek	
41CV1007	1	BR Midden	29 x 14	1	0-130	T1; abuts Toeslope	Trib. of Two Year Old Creek	
	2	BR Concentration	not estimated	2	63-81	T1	Trib. of Two Year Old Creek	

Table 9.1 Concluded.

Site	Feature #	Type	Estimated Size (m)	Test Unit	Depth (cmbs)	Topographic Setting	Location	Comments
41CV1023	1	BR Concentration	2 x >1	1	surface only	Upland; Paluxy Sand	Above Stampede Creek	
	3	BR Concentration	3 x 3	3	9-21	Upland; Paluxy Sand	Above Stampede Creek	
	4	BR Concentration	1 x 0.5	2	0-10	Upland; Paluxy Sand	Above Stampede Creek	
	5	BR Midden	16 x 9	6, 7	0-30, 0-30	Ancient Strath Terrace	Above Stampede Creek	
	6	BR Concentration	3 x 3	4	5-15	Upland; Paluxy Sand	Above Stampede Creek	
41CV1027	1	Annular BR Mound	11 x 10	1, 2	0-50, 0-50	Upland; Paluxy	Above Stampede Creek	Modified Bedrock Depression
	2	BR Midden	12 x 10	3	0-70	Upland; Paluxy	Above Stampede Creek	
	4	BR Concentration	10 x 10	5	0-40	Upland; Paluxy	Above Stampede Creek	
41CV1038	1	BR Midden	60 x 25	BT 1	0-35	T1A	Cowhouse Creek terrace	
	2	BR Concentration	25 x 15	BT 2	surface only	T1A	Cowhouse Creek terrace	
	5	BR Concentration	not estimated	3	73-82	T1A	Cowhouse Creek terrace	
41CV1098	1	BR Concentration	1 x 1	3	30-35	T1	Cowhouse Creek terrace	
41CV1105	3	BR Concentration	not estimated	2, 5	167-185, 175-181	T1	Cowhouse Creek terrace	
41CV1136	1	BR Concentration	not estimated	2	18-54	T1	Table Rock Creek and Trib.	
	2	BR Midden	not estimated	3	40-82	T1	Table Rock Creek and Trib.	
	3	BR Pavement	1.1 m x 0.9 m	1	118-130	T1	Table Rock Creek and Trib.	
	4	BR Concentration	not estimated	6	7-50	T0	Trib. of Table Rock Creek	
41CV1167	1	BR Midden	50 x 50	1	20-55	T1; onto Toeslope	Head of Stampede Creek	
41CV1200	1	BR Concentration	not estimated	1	45-68	T1	Trib. of Cowhouse Creek	
41CV1391	1	BR Midden	20 x 12	2	0-40	Upland; Paluxy Sand	Above Trib. of House Creek	
	1A	BR Midden	F1 and F1A are same	4	0-40	Upland; Paluxy Sand	Above Trib. of House Creek	
	3	BR Concentration	not estimated	6	99-106	T1	Trib. of House Creek	
41CV1423	1	Domed BR Mound	14 x 14	6	0-26	Higher Pleistocene Terrace	Table Rock Creek	Natural Bedrock Depression
	9	BR Concentration	not estimated	3, 7	20-55, 50-57	High Pleistocene Terrace	Table Rock Creek	

had been previously called "mounds," should instead be termed "burnt-rock middens," since they were not purposefully erected (Suhm et al. 1954:103-104). This point was reiterated in Suhm's 1960 statement "Since it is uniformly agreed that burned rock middens grew by accretions incidental to occupation, they are not usually referred to as mounds, the later term being reserved for intentional structures such as burial or temple mounds" (Suhm, 1960:68). Since that time, the vast majority of reports dealing with large burned rock features in Central Texas have used the term "midden" to describe substantial accumulations of burned rock, no matter what their form. However, in the process, the term was effectively divorced from its original functional connotation, leading to discussions of the "function" of "middens" that would no doubt confound archeologists from outside of Texas.

<u>Functional Interpretations of Burned Rock Middens/Mounds</u>

The history of functional interpretations has been outlined a number of times (e.g., Prewitt n.d.; 1991; Creel 1986; Weir 1976), and will be repeated only briefly here. The earliest interpretation is that of Pearce (1919), whose "kitchen-midden" hypothesis--that middens are the remains of cooking slabs and boiling slabs broken by heat--was the initial source of the term "midden." Some ten years later, Wilson (1930) attempted to relate the distribution of burned rock "mounds" to the distribution of sotol in the southwestern part of the Edwards Plateau. Wilson's study represents the first attempt to relate the features to a specific resource, and represents the first proposal of the "earth oven" hypothesis of mounds as processing centers for large amounts of a specific food source. Although Wilson introduced some valuable ethnographic data, he failed to address the large number of mounds present outside the range of sotol in Central Texas.

Another alternative was presented in the early 1940s by J. Charles Kelley and T. N. Campbell, who proposed that the features (still referred to as "mounds") accreted through the largely incidental construction of "intersecting hearths" over a long span of time (Kelley and Campbell 1942). A fourth major hypothesis was proposed in the late 1960s by W. M. Sorrow (1969), who suggested that the features (now "middens") were dumps where all types of incidental occupation debris, including large quantities of thermally-fractured rock, lithic debitage, food debris, and ash, were piled up on the margin of an occupation site. Support for this hypothesis was subsequently provided by Hester (1971), who proposed a similar mechanism for midden formation at the La Jita Site. However, the features addressed by Hester were composed almost entirely of burned rock and earth. Hester argued that the artifact-poor character of the features was consistent with the dump hypothesis, implying that the features were not generalized dumps, but rather strictly accumulations of broken hearth-stones.

Shortly afterward, the "earth oven" interpretation was revived by Prewitt (in a still-unpublished work on the Rogers Springs Site) and Weir (1976), who proposed (somewhat paradoxically) that the domed "middens" of Central Texas represent "earth ovens" where animal or, more likely, vegetal foodstuffs were prepared. This thesis was subsequently expanded by Creel (1986; 1991), who, basing his study on the suggestion by Weir (1976:125) and Hester (1973) that burned rock "middens" may represent the remains of acorn processing, attempted to correlate the distribution of "middens" with the prehistoric distribution of oak savanna. In contrast, Prewitt's Rogers Springs report (n.d.) favored the sotol-processing interpretation of Wilson (1930), and coupled it with a proposition that sotol expanded into Central Texas during the Middle Archaic and subsequently withdrew, explaining the temporal pattern in feature occurrence that he proposed (n.d.) and has continued to advocate (1981; 1985; 1991).

The History of Morphological/Functional Linkages and the Development of Burned Rock Midden Typology

In hindsight, one of the principal problems fostered by adoption of the term "midden" was the short shrift typically given to description of external morphology, which frequently makes it difficult to glean sufficient information from the older reports to determine what the character of the particular "midden" under discussion actually is. Up to the mid-1970s, most mound/midden investigations tended to focus on chronology based on projectile points and other artifact types, with limited discussions of the form and function of the features themselves. Nevertheless, there was a clear, if largely unstated, recognition that the term probably subsumed several different types of features, and several attempts to identify and classify various subdivisions gradually emerged.

One of the first and probably most important contributions was the result of work performed well outside of the Central Texas culture area. Based on experience in western Texas, New Mexico, and southern Colorado, Greer (1965:41-45) devised a typology of burned rock midden circles and mescal pits that linked morphologic characteristics with a functional model that explained form in terms of formation process and developmental stage. He interpreted the features he described as earth ovens used for plant baking, and provided ethnographic accounts that document the processing and preparation of plant resources in burned rock features. Subsequently, he published short articles (Greer 1967; 1968) concerning these same data with emphasis on the slight differences observed in these features. It was clear that Greer was describing one general type, with limited deviations or stages of development, of a burned rock feature that stemmed from cooking of some specific types of plant resources. Moreover, the "doughnut" morphology described by Greer didn't fit the majority of Central Texas burned rock features. Nevertheless, it did serve to shift the focus in Central Texas from purely chronological considerations toward broader behavioral issues.

A short time later, in a discussion of archeological sites on the southwestern edge of the Edwards Plateau, Hester (1970) pointed out that burned rock middens vary considerably in both size and artifact content (Hester 1970:247). Here again, specific differences in form and content were recognized, implying differences between burned rock features, but the term "midden" was still applied to all. This discussion was continued in the report on the La Jita Site (Hester 1971), where Hester postulated that dump features resulting from the cleaning of hearths should exhibit very little ancillary cultural material (e.g., flakes, tools, and bone), while high quantities of such material should indicate a suite of activities in and around the feature (supporting the "intersecting hearth" hypothesis). Of course, this presupposes that the dump area was only used to dispose of internal hearth debris, not the general litter that accumulated in an adjacent occupation area. Another pertinent observation made by Hester in the La Jita Site report is that, if a burned rock feature was the locus of intermittent high heating (as would be expected if the feature functioned as an earth oven), then the chert recovered from the feature should show signs of heat damage (e.g., discoloration, potlid fractures).

Weir, in his dissertation on the Central Texas Archaic, devised a four part morphological typology of burned rock "middens" that has since become firmly entrenched in the literature. Type 1 middens were described as oval, mounded accumulations of burned rock ranging from a few feet in diameter to "an acre in diameter," and were considered the typical Central Texas form. His Type 2 and Type 3 middens are variations on the ring midden previously described by Greer, and were again suggested to occur primarily west of Central Texas. Type 4 middens consist of unmounded concentrations of burned rock, and subsume the feature types termed incipient burned rock mounds, burned rock concentrations, burned rock pavements, and burned rock scatters in this study.

In a 1991 publication that resulted from a symposium on the burned rock middens of Texas,

Prewitt stated that the piles of angular thermally fractured rocks can generally be divided into two categories: domed and annular (Prewitt 1991:25). Prewitt implies a functional distinction between the two types, and indicates that domed varieties are typical of Central Texas, while annular middens are typical of West Texas; in other words, they equate both in form and geographic distribution to the Type 1 and Type 2/Type 3 middens of Weir, respectively. In that same 1991 symposium publication, Howard reviewed burned rock midden investigations. She stated that previous excavations focused on the "classic domed middens ... which are concentrated in central Texas and not in western Texas where ring middens dominate" (1991:45-69). Both the annular and domed types, while clearly differing in structure and formation process (Treece 1993; Abbott and Frederick 1990), represent "burned rock mounds" as the term is used in this report. However, because of the limited descriptive information on overall feature form in many of the reports cited, it is considered a virtual certainty that the 200-odd "classic domed middens" that Howard reviewed, represent an admixture of features that would be considered "burned rock mounds" and "burned rock middens" under our revised typology.

While the recognition that a number of different formation processes may apply and various features may represent entirely different functions (e.g., Peter 1982), most investigators continue to apply the term "midden" to all large burned rock features in Central Texas. Clearly, the distinction drawn between "burned rock middens" and "burned rock mounds" in this report bucks the established trend in the Texas archeological community. Recently, Collins (1991) has argued that existing methods of burned rock "midden" investigation have reached an impasse and that new and innovative techniques must be employed to further research. While this argument has merit, and new and innovative techniques should be employed whenever possible, we maintain that this approach cannot bear full fruit until a more basic obstacle is surmounted. Based on Mariah's work at Fort Hood during the preceding phase (Trierweiler 1994), during the first testing phase (reported in this volume), and during a subsequent testing phase (Mariah Associates, in preparation), we propose that much of the confusion surrounding burned rock "middens" in Central Texas is the result of a perceptual problem imposed by terminology; namely, that there are several distinctly different types of features that have been subsumed, to this point, under the term "midden." As a result, the literature is problematic largely because various investigators have been investigating apples and oranges, and reporting on them as "fruit." The following synthesis will hopefully demonstrate that, in fact, burned rock middens and burned rock mounds are indeed discrete, separable classes of features representing distinctly different types of behavior.

9.1.1.2 Burned Rock Mounds

In this report, a burned rock mound is defined as an accumulation of burned rock (typically limestone) exhibiting discernable relief above the ground surface and having a fairly regular, circular or oval shape in planview. Two distinct burned rock mound variants are recognized in the typology employed in this study. Annular burned rock mounds are mounds that possess a centralized depression, while domed burned rock mounds are mounds that lack a central depression. Examples of both of these two basic variants were investigated during the current project, and are listed as such in Table 9.1. A third variant, the incipient burned rock mound, is also initially recognized in the typology. This inclusion, which equates to Weir's Type 4 midden, is somewhat confusing, because the incipient burned rock mound is not actually a mound at all. Rather, it is a conceptual model of the early stage of development of the annular form, and consists of a thin concentration of burned rock surrounding a central firepit. Although they have been identified elsewhere (e.g., 41CC167, F 7 [Lintz et al. 1993]), no incipient mounds were defined at the 57 sites addressed here.

While the distinction between annular and domed mounds used here is a simple function of surface morphology, this usage can be quite misleading and requires clarification. Typically, annular mounds represent features that accreted around some type of central thermal feature, and have a heterogeneous internal composition that reflects this central focus (Prewitt 1991; Treece 1993:530-531; Abbott and Frederick 1991). Frequently, the central portion of these mounds is marked by a relatively rock-free zone beneath the depression, a central firepit excavated into the substrate, or an internal hearth constructed with larger slabs. Domed burned rock mounds, on the other hand, appear to represent features that accreted by a different process (or suite of processes); while they may be internally heterogeneous, and often include identifiable hearths or other structural features (see Quigg and Ellis 1994), many are simply structureless accumulations of burned rock, matrix, and artifacts, and all lack the centralized, doughnut-like internal morphology of the annular construction style.

Unfortunately, the surface morphology characteristics used to classify the mounds here do not necessarily correspond to the formation processes involved in their construction. Using surface characteristics alone, all that is required to convert a domed mound to an annular mound is a single vandal with a shovel and a few hours to kill. On the other hand, unless a noticeable depression is present, mounds with an "annular" internal morphology are indistinguishable from those with a "domed" internal morphology on the basis of surface topography. This point is graphically illustrated by Quigg's study of the temporal context of mounds on Fort Hood (Quigg and Ellis 1994:203-274), where some type of central feature was detected in all of what were initially believed to be a mix of annular and domed features. Moreover, the level of effort involved in the testing investigation was not always sufficient to resolve questions of internal composition. Thus, the typological classifications used here reflect surface morphology only, and some of the "domed" mounds listed in Table 9.1 may actually represent an "annular" style of construction and internal morphology, and vice versa.

Eight burned rock mounds were investigated during this phase of study. Although larger examples of mounds and mounds constructed on alluvial surfaces are known elsewhere (cf. Lintz et al. 1993; Treece 1993), all burned rock mounds investigated in this study were less than 15 m in diameter and were located on the uplands or on a stable high Pleistocene terrace (see Table 9.1). Six were investigated with a 1 m^2 unit during the testing-phase, while the remaining two were previously tested using backhoe trenches and 1 m^2 units during the 1993 pilot study of burned rock mounds (Quigg and Ellis 1994:203-274). The mound features ranged from 9 to 14 m in diameter, with four measuring 11 to 12 m in diameter. All were from 30 to 100 cm high (relief above ground surface), with an overall average height of 66 cm. In general, the features are composed of angular and blocky burned limestone clasts that have been broken by thermal shock contained in a very dark grayish brown to black, clayey or loamy matrix. In most cases, almost all clasts in the mounds are supported by other clasts, with the fine matrix filling in the interstices.

A central depression was observed on the surface of four (50%) of the mounds providing basis for their identification as "annular" mounds. In addition, a possible centrally located pit and internal slab lined feature was detected in the profile of a backhoe trench excavated in one of the "domed" mounds, an intentionally-modified bedrock depression was found at the base of three of the "annular" and one of the "domed" mounds, and an apparently unmodified bedrock depression was detected beneath another of the "domed" mounds. Each of the modified depressions were flanked by horizontally stacked limestone slabs that were noticeably larger than most of the other clasts in the features. Three of the bedrock depressions were situated directly below the central depression on the surface of the "annular" mounds, suggesting that a central hearth feature was utilized throughout the "life" of mound construction and use.

Generally, relatively sparse amounts of lithic tools and debitage, charcoal, and ecofacts were contained within the mounds, especially when compared to the investigated burned rock middens (see section 9.1.1.3). With the exception of the one mound situated in the Paluxy Sand environment, the potential for substantial Holocene-age sediment deposition by purely natural processes in the mound settings is minimal to negligible.

9.1.1.3 Burned Rock Middens

A burned rock midden, here defined, is a relatively thick, amorphous deposit of buried burned rock that does not exhibit significant relief and varies greatly in shape and size. The overwhelming majority (n=25; 78%) of features defined as burned rock middens were located on aggrading slopes, toeslopes, and terraces, suggesting that the lack of relief is probably principally a function of depositional environment, and that if such a feature were to form on a stable surface, it would probably also have a mounded morphology (and may indeed have had a mounded morphology relative to the relevant paleosurface). However, the size and shape of the features still appears to be much more variable than is characteristic of the mounds.

Burned rock middens are striking when viewed in profile and are generally composed of dense burned rocks within a very dark, organic-rich fine matrix. They typically exhibit a chaotic internal structure, although internal features can sometimes be identified. The matrix is typically black loam to clay loam, and the rock generally exhibits mixed clast and matrix support; in other words, middens typically have a higher matrix-to-rock ratio than mounds. When compared to burned rock mounds, high frequencies of lithic tools, debitage, and ecofacts are typically contained within these middens (see section 9.1.4).

Thirty-one burned rock middens were identified (see Table 9.1) and are individually described in Chapters 5.0 and 6.0. Approximately half of these features were vandalized and/or had surface disturbances, thus allowing size estimation. Estimated sizes ranged from 12 by 11 m to 150 by 50 m. The former of these is buried beneath a Paluxy Sand deposit and the size estimate is based on test pit results and the extent of the sand deposit. The latter is located along a toeslope, and the size estimate is based on the extent of vandalism (contiguous potholes containing dense cultural debris).

Although vertical exposures were limited to test unit and trench profiles, observed thicknesses varied from 25 to 230 cm, with an overall mean thickness of 76 cm. Internal structural components were rarely found within the middens. Of the 31 middens tested, only six (19%) contained internal features. In F 2 at 41CV97, an ash lens (F 2A), a burned rock pavement (F 2B), and a mussel shell lens (F 2C) were detected. Site 41CV97, F 3 contained two separate internal burned rock pavements (F 3A and F 3B). Three other middens (F 4 at 41BL339, F 6 at 41CV174, and F 1 at 41CV1391) contained an internal hearth. Interestingly, the hearth (F 2) at the latter of these middens extends into a Paluxy bedrock depression. The only other internal feature discovered in a midden was a carbonized post at 41CV1167 (F 2). Of note, a large rock-filled hearth (F 2) with a shallow basin morphology was found a few centimeters below a midden (F 3) at 41CV960.

Five of the middens are buried in Paluxy Sand deposits. Three of these (F 1 at 41CV319, F 1 at 41CV595, and F 2 at 41CV1027) appear to be within large natural depressions or previously gullied areas. Only one internal structural component (F 2, hearth within F 1 at 41CV1391) was found in the test units excavated on these five middens. As discussed more fully later (see section 9.1.4), the rate of artifact return from these upland middens is dramatically lower than the more typical toeslope and terrace features, suggesting that they probably represent a different phenomenon.

9.1.1.4 Burned Rock Concentrations

A burned rock concentration, is defined here as a relatively shallow, amorphous grouping of burned rocks, typically one to two clasts thick, located on an extant surface or a buried paleosurface. In general, although a "typical" burned rock concentration is readily recognized, the term is difficult to define precisely, given that burned rock concentrations grade into the midden category at one extreme and into burned rock scatters (which, although defined as a feature type in Trierweiler (1994), were not treated as such during current testing) at the other. Thus, the problem becomes where to draw the typological boundary. Although some type of quantitative measure could be arbitrarily established, to this point the term has been applied qualitatively to a spatial aggregate of burned rock that is not dense enough to qualify as a midden yet too discrete to be considered simply a scatter. While this usage seems unsatisfactorily vague in print, in practice it has proven effective.

Several trends are apparent in the features discussed here. The burned rock concentrations examined during testing usually contained low frequencies of other types of cultural material. Typically little, if any, charcoal was present; debitage was absent in more than half of the concentrations examined (and, when present, occurred in low frequency), and small quantities of mussel shell and/or bone were found in fewer than a third of the features. In all, 26 burned rock concentrations were investigated with an excavation unit during formal testing (see Table 9.1). Of these, 11 were partially exposed on the surface and two were thought to be restricted within 1 x 1 m test pits. Thus, a size estimate was made on 50% of these features, while the size on the remaining 13 is unknown. Estimated sizes ranged from less than 1 x 1 m to 25 by 15 m. Thicknesses of all the burned rock concentrations ranged from 0 to 40 cm, with an overall mean thickness of about 14 cm. Testing results indicate that eight of these features are restricted to the surface or a few centimeters below the surface. Seven were described as possible dispersed hearths. No internal structural components were found within these features.

9.1.1.5 Burned Rock Pavements

A burned rock pavement, here defined, is an extremely dense arrangement of burned rock, typically one to two tiers thick, that appears to have been intentionally fitted together, jigsaw-style, to form a flat, moderately articulated surface. Although their function is unknown, it is likely that they represent cooking or roasting surfaces. Only four burned rock pavements were identified from the 57 sites, and all of these were encountered in test pits, limiting the chance for estimating dimensions. In addition, three of the identified pavements were internal features within larger middens, and two were discovered in discrete strata of the same test pit at 41CV97, suggesting that the activity represented was performed repeatedly at that location.

9.1.2 Hearths

A hearth, as defined in the *Merriam Webster Collegiate Dictionary, Tenth Edition* (1993), is "the floor of a fireplace" and "a vital or creative center." While the former definition is more pertinent to the term as used in an archeological context, the latter probably applies equally well to their role in prehistoric society. The hearths investigated during the testing phase tended to be discrete and readily recognized in a site setting. Usually, morphology is a key identifier when differentiating feature types and subsets, as evidenced in Weir (1976), Prewitt (1981), and Trierweiler (1994). Such physical attributes are used to differentiate hearth types within this sample.

Forty seven hearths were identified on 16 (28%) of the 57 formally tested prehistoric sites. Since many of the terrace sites contained Holocene deposits at least 2 m thick, backhoe trenching was necessary. Thus, numerous hearths were exposed during trenching and therefore impacted to varying degrees. In addition, a few hearths exposed in

trench profiles were not excavated. In some cases, a hearth was not wholly contained within a test pit, and the feature extended beyond the unit's boundaries as evidenced by the profile. Also, a few exhibited erosion due to exposure in cutbanks. Taking these circumstances into account, absolute dimensions could not be determined for 87% of the hearths encountered, although only 37% were not investigated enough to allow an estimate to be made. Therefore, size, such as large versus small basin (Prewitt 1981), could not be comfortably assigned and was not a determining factor when defining hearth types. However, excavated dimensions are noted so that a minimum size can be ascertained. Herein, the two common denominators used to define morphology, hence hearth type, are the method of construction and the shape of the surface upon which the hearth rested.

From the sample of 47 hearths, six hearth types were identified:

- Type 1: flat, angular rock/cobble layered;
- Type 2: flat, slab layered;
- Type 3: basin, very little or no burned rock;
- Type 4: basin, angular rock/cobble layered;
- Type 5: basin, slab layered; and
- Type 6: dispersed.

Within Types 4 and 5, two distinct varieties were identified (see below). For clarification, key descriptive terms are defined under each hearth type. The characteristics of each hearth investigated during this phase of investigation are detailed in Table 9.2.

In general, Type 1 hearths consist of one to two layers of small (1 to 4 cm) and medium sized (5 to 10 cm) angular burned rocks and/or burned cobbles. Within this construct, contiguous rocks may partially overlap, and appear to be haphazardly arranged, as opposed to burned rock pavement construction in which the rocks typical abut one another and are densely packed (see section 9.1.1.5). The base of these hearths are relatively flat, indicating that the rocks were horizontally laid, and therefore show no evidence of a purposefully prepared surface (although surface leveling could have occurred). Eleven of the hearths ranged from 5 to 19 cm thick (mean of 10.5 cm), with one outlier 34 cm thick. Three hearths contained distinct remnants of firing episodes. In two instances, charcoal was underlain by an oxidation rind near the base of the hearth, with a charcoal lens, along the base of the hearth, apparent in the third case.

Type 2 hearths were constructed of tabular slabs at least 5 cm in diameter, and typically 10 cm or more in diameter. As with Type 1, the base of the hearth is horizontally laid (flat). At 41BL538 (rockshelter), a hearth was identified in a test pit profile following excavation. The hearth was primarily constructed of thin limestone slabs (average 10 cm long x 3 cm thick) and some intentionally used (burned) roof spalls. Another hearth (F 10, 41CV95) consisted of nine large burned slabs and numerous small fragments, with some rocks fire cracked in situ. Both of these hearths were comprised of a single rock layer.

All Type 3 hearths were basin shaped and had a rounded base, implying an apparent prepared surface. Very little or no burned rocks were used in the hearth construction, with no obvious consistency in rock type or size in association. The feature matrix consists of ash and/or charcoal, with either intermixed burned earth (typically in shelters) or an underlying oxidation rind that ranged from a few centimeters to a maximum of 9 cm thick. The feature fill is indicative of high heat intensity (oxidized soil) and a somewhat long burning fire (ash and charcoal). Overall, three hearths had a maximum thickness between 4 and 7 cm, three ranged from 12 to 18 cm, and one hearth (F 3, 41CV1200) was 30 cm thick. At 41CV1200, a "mini-trench" was manually excavated through the hearth center revealing various ash, oxidized earth, and clay-silt lenses that may represent repeated use. In addition, 14 unburned, tabular slabs overlay the top of the hearth. This may represent an aborted attempt to reuse the hearth or an endeavor to smother a pre-existing fire. *Krotovina* disturbance, probably a

Table 9.2 Dimensions and Environmental Settings of Hearth Features.

Hearth Type Site	Feature Number	Excavated Dimensions (cm)	Thickness (cm)	Estimated Dimensions (cm)	Rock Layers	Landform	Physiographic Regime	Comments
1 (Flat, angular rock/cobble layered)								
41BL154	2	49 x 23	7	49 x 50	1 Layer	T1 Terrace	North Nolan/South	
41BL339	1	unexcavated	10	58 cm long	1 Layer	T1 Terrace	East Cowhouse	
41BL567	1	53 x 40	12	53 x 40	1 Layer	Rockshelter	Cowhouse/Taylor/Bear	
41CV95	3	50 x 25	5	unknown	1 Layer	T1 Terrace	West Cowhouse	
41CV95	4	85 x 88	34	85 x 88	2 Layers	T1 Terrace	West Cowhouse	
41CV95	7	42 x 40	8	42 x 50	1 Layer	T1 Terrace	West Cowhouse	
41CV97	9	60 x 20	19	60 x 90	1 Layer	T1 Terrace	West Cowhouse	
41CV97	11	42 x 33	13	42 x 66	1 Layer	T1 Terrace	West Cowhouse	
41CV97	13	45 x 55	7	unknown	2 Layers	T1 Terrace	West Cowhouse	
41CV960	1	35 x 22	10	unknown	1 Layer	T1 Terrace	West Cowhouse	
41CV1105	2	unexcavated	10	28 cm long	1 Layer	T1 Terrace	West Cowhouse	
41CV1136	6	54 x 49	12	unknown	1-2 Layers	T1 Terrace	Table Rock	
2 (Flat, slab layered)								
41BL538	1	unexcavated	10	40 cm long	1 Layer	Rockshelter	Cowhouse/Taylor/Bear	
41CV95	10	100 x 55	12	unknown	1 Layer	T1 Terrace	West Cowhouse	
3 (Basin, little or no rock)								
41BL567	2	25 x 20	6	40 x 35	N/A	Rockshelter	Cowhouse/Taylor/Bear	
41CV97	4	61 x 25	4	61 x 50	N/A	T1 Terrace	West Cowhouse	
41CV97	5	66 x 64	7	64 x 80	N/A	T1 Terrace	West Cowhouse	
41CV97	16	75 x 60	17	75 x 60	N/A	T1 Terrace	West Cowhouse	
41CV97	17	55 x 25	12	55 x 50	N/A	T1 Terrace	West Cowhouse	
41CV1085	1	100 x 85	18	130 x 110	N/A	Rockshelter	Shell Mountain	
41CV1200	3	100 x 95	55	120 x 120	N/A	T1 Terrace	West Cowhouse	
4 (Basin, angular rock/cobble layered)								
41BL339	4A	65 x 63	14	80 x 70	3 Layers	T1 Terrace	East Cowhouse	base of midden
41CV95	5	68 x 40	20	68 x 80	1 Layer	T1 Terrace	West Cowhouse	
41CV97	7	80 x 70	8	unknown	2 Layers	T1 Terrace	West Cowhouse	
41CV97	12	100 x 36	25	100 x 110	1 Layer	T1 Terrace	West Cowhouse	"pie plate"
41CV97	15	80 x 30	19	unknown	2 Layers	T1 Terrace	West Cowhouse	"pie plate"
41CV174	2	unexcavated	15	52 cm long	1 Layer	T1 Terrace	Table Rock	
41CV174	4	80 x 40	21	80 x 80	2 Layers	T1 Terrace	Table Rock	
41CV174	10	60 x 40	7	unknown	1 Layer	T1 Terrace	Table Rock	within midden
41CV587	2	60 x 38	31	unknown	2-3 Layers	T1 Terrace	Shell Mountain	
41CV960	2	100 x 100	18	unknown	1 Layer	T1 Terrace	West Cowhouse	8 cm below midden deposit
41CV1027	3	100 x 110	15	100 x 110	2 Layer	T1 Terrace	Stampede	
41CV1038	3	100 x 100	23	unknown	1-2 Layers	T1 Terrace	West Cowhouse	
41CV1038	4	76 x 66	22	76 x 70	2-3 Layers	T1 Terrace	West Cowhouse	
41CV1038	6	87 x 63	11	87 x 83	2-3 Layers	T1 Terrace	West Cowhouse	
41CV1105	1	65 x 55	7	unknown	1 Layer	T1 Terrace	West Cowhouse	
41CV1105	4	30 x 40	10	unknown	1 Layer	T1 Terrace	West Cowhouse	
41CV1200	2	100 x 100	46	130 x 130	3 Layers	T1 Terrace	West Cowhouse	two superimposed hearths

Table 9.2 Concluded.

Hearth Type Site	Feature Number	Excavated Dimensions (cm)	Thickness (cm)	Estimated Dimensions (cm)	Rock Layers	Landform	Physiographic Regime	Comments
5 (Basin, slab layered)								
41BL339	2	60 x 50	22	120 x 50	2-3 Layers	T1 Terrace	East Cowhouse	"pie plate"
41CV97	19	60 x 30	10	unknown	1 Layer	T1 Terrace	West Cowhouse	"pie plate"
41CV174	3	89 x 60	15	unknown	3 Layers	T1 Terrace	Table Rock	"pie plate"
41CV174	5	100 x 65	22	unknown	2 Layers	T1 Terrace	Table Rock	"pie plate" superimposed above Feature 8
41CV174	7	52 x 46	12	52 x 46	1 Layer	T1 Terrace	Table Rock	"pie plate"
41CV174	8	100 x 100	23	unknown	1 Layer	T1 Terrace	Table Rock	"pie plate " superimposed below Feature 5
41CV1136	5	51 x 35	13	51 x 55	2 Layers	T1 Terrace	Table Rock	
41CV1391	2	55 x 55	23	100 x 100	1-2 Layers	T2 Terrace	Turkey Run	base of midden incorporated natural bedrock depression in construction
6 (Dispersed)								
41CV97	10	80 x 70	4	80 x 70	N/A	T1 Terrace	West Cowhouse	

result of the soft texture of the matrix, was noted in 50% of Type 3 hearths.

Type 4 hearths are basin shaped and filled with small or (more typically) medium sized angular burned rocks and/or burned cobbles. Some are composed of three stacked rock layers, with most one to two layers thick. Sixteen of 17 hearths ranged from 7 to 31 cm thick, for a mean of 17 cm. At 41CV1200, F 2 was 46 cm thick, however, post-excavation examination revealed several "superimposed hearths." Upon removal of the first burned rock layer, a 2 cm thick lens of charcoal was noted. Immediately below this, a second and third rock layer was stripped revealing another charcoal lens (2 to 3 cm thick) beneath the third tier. Note that an overall greater thickness does not necessarily correspond to multiple rock layers, but may be a result of rock size and associated organic remains. Approximately half of the sample contained dense charcoal deposits amongst the rocks or a discrete charcoal lens visible along the base of the hearth. In one case (F 4, 41CV174), a charcoal lens was underlain by an oxidation rind.

Within the Type 4 sample, a few "special cases" need to be addressed. Three hearths (F 4A, 41BL339; F 10, 41CV174; and F 2, 41CV960) were encountered within or close proximity to burned rock midden deposits. The presence of a hearth in these deposits need not be surprising, however, discovery is a rarity. In many testing phases, "telephone booth" excavation (single 1 m^2 units) is the norm. From experience, the placements of units within large and extensive midden deposits is not conducive to the identification of internal features. This is clearly demonstrated by the fact that the hearths identified in middens typically occurred near the base or top of the deposit.

Another distinction within the sample of Type 4 hearths was a subtle but noticeable difference in construction style. Two hearths (Fs 12 and 15) at 41CV97, did not reveal the "classic basin" construct. The rocks located around the perimeter still angled toward the middle of the hearth; however, rocks at the hearth center were horizontally laid. Instead of a curved base, these hearths exhibit a "pie plate" morphology. This construction style may allow for a greater, evenly heated surface.

Morphologically, Type 5 hearths are very similar to Type 4, with the distinction that large, tabular slabs were typically used in construction of Type 5, as opposed to the smaller angular rocks and cobbles of Type 4. Half of the Type 5 sample consisted of a single rock layer, with the remainder two to three layers thick. Also, five hearths from three sites exhibited "pie plate" morphology (see above) as opposed to the "classic basin" shape. Overall, the hearths ranged from 10 to 30 cm thick, with a mean of 18 cm. As with Type 4, a greater thickness is not indicative of more rock layers. In two cases, a charcoal lens and burned soil was noted in the feature matrix, with one hearth containing an ash and charcoal fill underlain by an oxidation rind. Charcoal chunks were noted in a few additional hearths. One hearth (F 2, 41CV1391) was encountered at the base of a midden deposit. The sandy matrix was charcoal stained and a natural bedrock depression was incorporated into the hearth construction.

Only one example (F 10, 41CV97) of a dispersed hearth (Type 6) was identified. This feature consisted of two distinct but associated, ovate areas of oxidized soil, confined to a 1 m^2 test pit. The oxidized areas were 5 cm thick and had flat bases. A few small burned rocks, heavily charred bone fragments, and heat treated lithic debitage were recovered from the oxidized sediment and the matrix surrounding these stained areas. Even though this sample is extremely limited, this type appears to represent an expedient hearth (no purposefully prepared surface) of high heat intensity. The lack of any ash or charcoal, as is usually associated with an area of oxidation based on foregoing examples, implies dispersion of the fill, whether natural or purposeful.

9.1.3 Other Features

9.1.3.1 Mussel Shell Features

Mussel shell was recovered from 34 of the 57 sites clearly indicating that mussels were being utilized as a food source. However, most of this material occurred as one component of a diverse suite of faunal remains in rockshelter fills and burned rock features, suggesting that mussels typically formed one part of a broader-based economy. Only one feature that can be considered a mussel shell feature was detected. This accumulation, F 3, was detected in the alluvial terrace of Cowhouse Creek at 41BL339. Approximately 380 shells, 5 bone fragments, 11 burned rocks (4 kg), and 17 flakes were recovered from the portion of this feature excavated in TP 5. A 60 x 50 by 7 cm shallow depression was recognized along the eastern half of TP 5. It contained a few burned rocks, a biface, 10 to 15 bone fragments, and 100 to 120 mussel shells (about six layers thick). Charcoal flecking, although observed across the entire shell lens, was most noticeable in the depression, suggesting that it might be a hearth used to prepare the mussels for consumption. Feature 3 extended beyond the TP and is estimated to cover at least 2.5 x 2 m area on the basis of the backhoe trench exposure.

Another mussel shell accumulation (F 10) was discovered at 41CV95 in the alluvial terrace of Cowhouse Creek. However, because the feature clearly represented a hearth with associated mussel shell, it was classified as a hearth. The feature was composed of a linear cluster of about 25 burned rocks, of which several rocks appeared to have been fire-cracked in place and shattered upon removal. No charcoal staining was observed in F 10, but more than 60 mussel shell umbos were in association. Most mussel shells occurred at the same depth as the burned rocks, suggesting the mussel shells were used at the same time as the burned rock. A mussel shell lens (F 2C) was also discovered in F 2, 41CV97.

In all instances, the accumulation of mussel shell appear to have resulted from human procurement and subsequent consumption. Burned rock is directly associated, as is charcoal in F 3 (41BL339), implying the mussels were heated and or cooked prior to consumption. These mussels obviously served as a food resource at these three locations and document utilization of aquatic resources. Sites containing mussel shell accumulations add to our limited understanding of

the distribution of this resource and the time periods in which they were exploited. Although not often discussed in the archeological literature, the nature and quality of water from which these shells came can also be extrapolated from studying the type of mussels represented (Neck and Lintz 1993; Howells 1992; 1993).

9.1.3.2 Carbonized Post

A unique feature, a well preserved carbonized post (F 2), was encountered at 41CV1167. This post was discovered in TP 1 in a large burned rock midden (F 1) overlying an alluvial terrace. The circular post was positioned vertically within the midden matrix about 30 to 50 cmbs. In profile, the post was a 20 cm long single piece of live oak wood that tapered from 10 cm in diameter at the top to a 5 cm diameter flat bottom.

The function of this single intrusive post is problematic. A radiocarbon age of 610 ± 50 BP (Beta b-79049) was obtained from the post, indicating that it does, in fact, represent a prehistoric feature. In contrast, a radiocarbon assay on charcoal from the surrounding midden matrix (TP 1, Level 4) yielded an age of 410 ± 80 BP. This age was from the matrix surrounding the "top" of the post, and may indicate that the post was in place for several hundred years as the feature accreted. Alternatively, the post may represent the "old wood" phenomenon (Schiffer 1987) or the matrix date may be based on charcoal that was churned into the matrix. The function of the post is likewise unknown; it may represent a simple support rack or a more substantial structure. Although its location in the midden seems intuitively inconsistent with a prehistoric habitation structure, it may in fact indicate such a circumstance. Alternatively, there are several other types of wooden superstructures (e.g., drying racks, spit supports) that could potentially be associated with an accumulating midden. Carbonized posts in archeological sites are rare in Central Texas, while similar posts or stains recognized in adjacent regions are often associated with the Late Prehistoric cultures (Boyd et al. 1993). Only further testing in the immediate area will add sufficient data to help interpret this unique feature.

9.1.3.3 Burial Pit

Although human skeletal remains were found in at least three rockshelters, only one definite burial pit, F 1 at 41BL744 (rockshelter), was identified. The top of this pit was recognized in the northwestern corner of TP 2 at a depth of 50 cmbs. This was near the center of the rockshelter and close to the talus slope edge at the dripline. Because it was encountered in the corner of the test pit, the exact size and shape of the burial pit was not determined, but the pit was delineated by a sharp boundary between the yellowish brown silt shelter fill and the very dark loam pit matrix. Non-articulated human remains were exposed in the pit, but excavation were stopped once the bones were identified as human. This feature appears to represent either a flexed primary burial or a secondary burial of unknown origin and association. The fill probably represents an admixture of different sediments excavated from the pit and present on the surrounding surface.

9.1.3.4 Caches

Two lithic "caches," F 1 at 41BL208 and F 2 at 41CV137, were discovered during site investigations. The cache at 41BL208 consisted of a surficial scatter of 41 crude bifaces and several pieces of debitage spread over a 5.1 x 3.7 m area on the colluvially-mantled limestone slope. The second cache was recovered from 30 to 40 cmbs in the burned rock midden (F 1) at 41CV137. It was composed of several broken projectile points, various chert tools, and nearly 100 flakes. Both caches probably represent recent human activity. At 41BL208, the clustering of tools was determined (by careful reading of the various pertinent survey reports) to have been the result of a dispersed cull created by the individuals who originally discovered the site in 1986, while the cache at 41CV137 was subsequently determined to be in vandalized context. Consequently, neither of these apparent caches appear to be prehistoric, and

thus have no relevant functional interpretation. Generally, large bifaces or flakes are cached for subsequent use in regions with poor or limited chert resources, and discovery of cached lithics in the Fort Hood region would be relatively unusual since chert resources are abundant and immediately available. However, such features might arise in a chert rich area from the expedient collection of tools and preforms from other sites, or from staging accumulations prepared in anticipation of export in a trade economy.

9.1.3.5 Ash Lenses

One ash lens was defined as a formal feature during the testing phase (F 2A, 41CV97). It consisted of a 75 cm diameter circle of light gray ash with a maximum thickness of approximately 22 cm contained within a larger burned rock midden (F 2). The ash lens contained a variety of cultural detritus, including relatively small burned rocks, burned and unburned bone fragments, mussel shell, charcoal, and two Scallorn projectile points. Because the feature appeared to have a flat base, it was tentatively interpreted as a dump pile derived from cleaning of a hearth, but it is possible that it actually represented a locus of burning. In either case, the preservation of the feature suggests that it was rapidly buried by cultural processes. This rapid burial is most consistent with the dump theory of midden formation, because any of the other postulated models imply at least a moderate period of subaerial exposure which would have probably resulted in dispersal of the ash.

9.1.4 Artifact Content of Features

9.1.4.1 Mounds, Middens, Concentrations, and Pavements

Apart from the differences in form, composition, and location previously outlined, the strongest argument for the asserted distinction between burned rock mounds and burned rock middens concerns differences in artifact content. Table 9.3 illustrates the total return and return per m^3 of lithics, bone, shell, and burned rock from the mounds, middens, concentrations, and pavements

Table 9.3 Artifact Frequencies from Burned Rock Features.

		Burned Rock Feature Type			
		Mound	Concentration	Midden	Pavement
Total Features Tested		8	26	31	4
Total Levels Excavated		62	61	267	2
LITHICS	Total	667	532	30,103	66
	Avg. per m^3	108	87	1,127	330
BONE	Total	0	74	2,684	11
	Avg per m^3	0	12	100	55
MUSSEL SHELL	Total	2	33	647	157
	Avg per m^3	< 0.5	5	24	785
BURNED ROCK	Total kg	2,597	536	5,324	102
	Avg kg per m^3	419	88	199	510
	Total count	22,502	2,377	30,141	351
	Avg count per m^3	3,948	390	1,129	1,755

excavated during the testing phase. As can be seen, with the exception of the rock itself, burned rock middens typically contain from one to several orders of magnitude more cultural detritus than is contained in burned rock mounds. This implies that the two types of features represent distinct and separate cultural phenomena. While burned rock middens are typically replete with a variety of cultural detritus and contain a very high fine matrix-to-rock ratio, burned rock mounds are typically much more artifact poor and contain much more closely packed rock.

However, differences are much more complex than this aggregate view implies. In order to provide for comparison of variability among the populations, a standardized, comparable measure of the lithic, faunal, and burned rock return from each individual feature was calculated and graphed. Rather than breaking out into two discrete groups, these data indicate a substantial degree of overlap between the two identified feature types, particularly in the relationship between lithics and burned rock (Figure 9.2). While it could be argued that this overlap demonstrates that the subdivision between mounds and middens proposed here is invalid, and that the individual features actually represent points on a continuum of variability inherent in a single feature type, we argue that the data indicate that a number of different feature types are represented.

One of the principal impediments to interpretation of these features is the lack of a clear linkage between function on the one hand and morphology and artifact content on the other, because function remains largely unknown. We propose that while form follows function, attempts to explain middens as a class of features by identifying a single function, whatever it may be (e.g., acorn processing, sotol processing, cooking, roasting, dumping of hearth debris, etc.), are bound to fail because the range of morphological variability inherent in the features supports a polygenetic origin. In other words, all of the functional interpretations advanced thus far, and additional functions that have yet to be postulated, have probably contributed to the formation of the variety of features in Central Texas that are commonly termed burned rock middens, but to varying degrees at different sites. Thus, the features represent complex human behavior, and the morphology and content of a given feature is a product of the relative importance and duration of a number of discrete types of activity, tempered by the character of available resources, the geomorphic setting, the edaphic environment, and the magnitude of cultural and natural formation processes. While some features may result almost entirely from a single activity (whatever its nature), most probably represent the combined influence of a dominant activity and a number of related or unrelated ancillary activities, and still others may represent a suite of activities in which none can be defined as dominant.

Given this statement, how valid is the division of the formerly single class of features (middens) into two discrete classes (mounds and middens) proposed here? We believe that it is appropriate, because it leads to a realistic appreciation of the range of variability in the features. While variability has been noted a number of times previously (e.g., Hester 1970; Peter 1982), the persistence of the single term midden has served to deemphasize this variability, and much of the research in the field is still directed towards finding the answer to burned rock middens.

The following paragraphs detail the artifact return from the features addressed during this phase of testing at Fort Hood. It demonstrates that the character of the artifact content in mounds is very different on average from that in middens; however, it does not mean to imply that these are the only two valid subdivisions. Rather, we believe that there are probably a number of valid (and possibly cross-cutting) subdivisions based on morphology and artifact content that would be analytically useful, including at least two discrete types of mounds (annular and domed) and an unknown number of different types of middens. Each of these undefined types, in turn, may represent a single activity or a suite of disparate

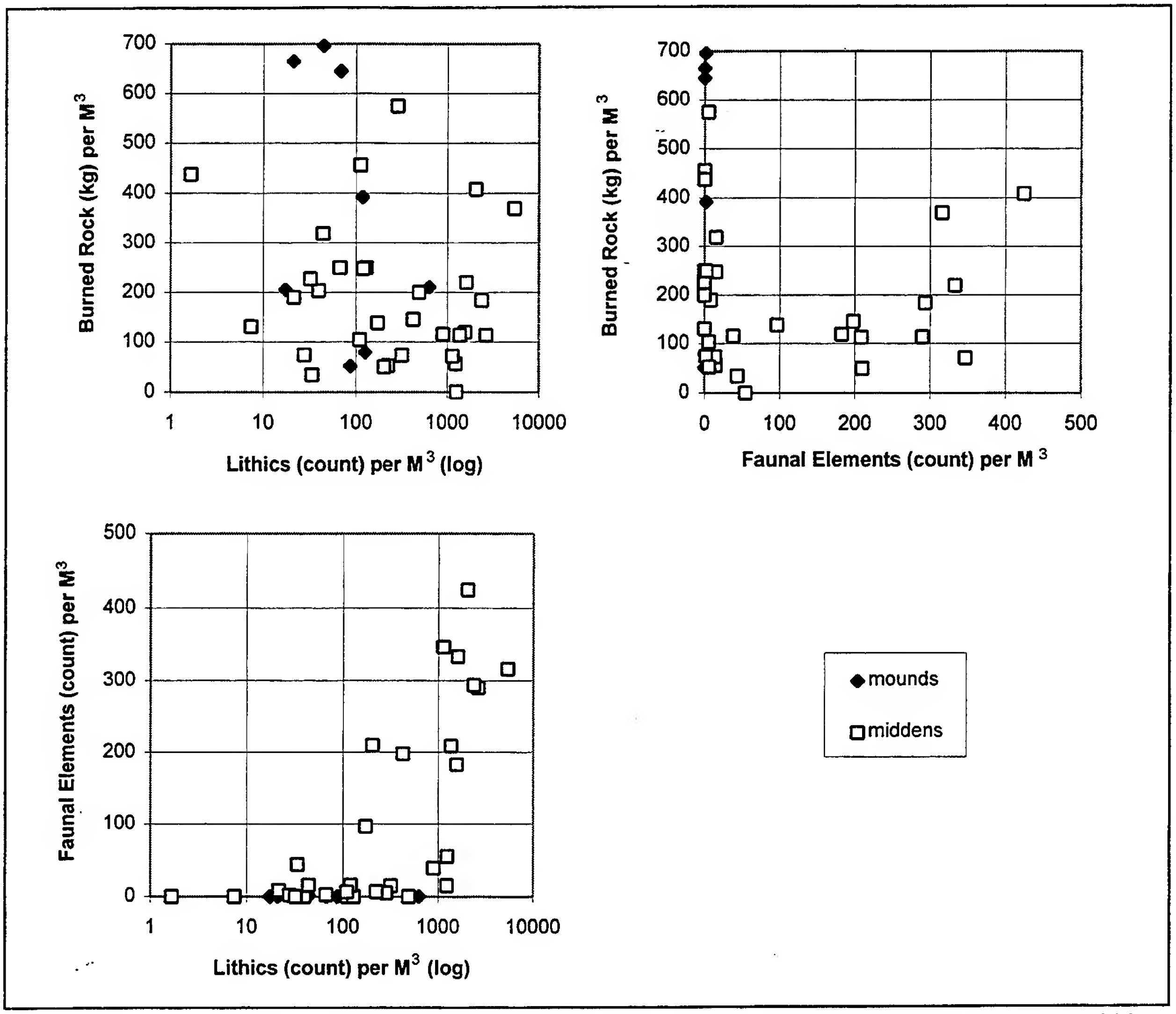

Figure 9.2 Comparison of Variability in Burned Rock, Lithic, and Faunal Return Between Middens and Mounds.

activities performed with varying intensity, and tempered by post-depositional formation processes. Thus, any increase in our ability to discriminate between different features on the basis of morphology and artifact content, and to communicate these differences among our peers in a mutually-intelligible manner, represents a step in the right direction. The distinction drawn here represents such a step.

The diagnostic projectile points (Table 9.4) and tools (Table 9.5) recovered from the features also show interesting trends. Unsurprisingly, the overwhelming majority of points (93%) and tools (95%) were recovered from the artifact-rich middens. Although Early Archaic (Bulverde) and Middle Archaic (Pedernales and Marshall) are a significant presence in these features, a variety of Late/Transitional Archaic and Late Prehistoric types form the bulk of the sample. This may either indicate that the features were accreting, albeit intermittently, throughout the Archaic and Late Prehistoric, or that collection and subsequent incorporation of "heirloom" points was common in the Late Archaic and Late Prehistoric. Another very interesting characteristic is the high frequency

Table 9.4 Frequency of Projectile Points from Burned Rock Features by Time Period.

		Burned Rock Feature Type				
Period	Point Type	Mound	Concentration	Midden	Pavement	Total
Paleoindian	Angostura	0	1	0	0	1
Early Archaic	Nolan	0	1	0	0	1
	Bulverde	0	0	3	0	3
	Subtotal	0	1	3	0	4
Middle Archaic	Pedernales	0	0	8	0	8
	Marshall	0	0	3	0	3
	Subtotal	0	0	11	0	11
Late/Transitional Archaic	Castroville	0	0	5	0	5
	Darl	0	0	11	0	11
	Edgewood	0	0	5	0	5
	Ellis	0	0	1	0	1
	Ensor	0	1	4	0	5
	Lange	0	0	2	0	2
	Marcos	0	0	2	0	2
	Montell	0	0	1	0	1
	Subtotal	0	1	31	0	32
General Archaic	Yarbrough	1	0	0	0	1
	Other Dart	2	1	21	1	25
	Subtotal	3	1	21	1	26
Late Prehistoric	Bulbar Stemmed	0	0	1	0	1
	Chadbourne	0	0	1	0	1
	Godley	0	0	1	0	1
	Sabinal	0	0	1	0	1
	Scallorn	0	0	24	0	24
	Other Arrow	0	0	9	0	9
	Subtotal	0	0	37	0	37
Grand Total		3	4	103	1	111

of Scallorn arrow points, diagnostic of the Austin Phase of the Late Prehistoric, which contrasts sharply with the absence of the later Toyah Phase Perdiz and Cliffton points common in other settings on the fort (particularly rockshelters). Although Scallorn points are also common in rockshelters, the apparent abandonment of burned rock middens in the latter Late Prehistoric may indicate a substantive shift in site location and/or adaptive strategy by the Toyah people.

Table 9.5 Frequency of Lithic Tools from Burned Rock Features.

	Burned Rock Feature Type				
	Mound	Concentration	Midden	Pavement	Total
adze	0	0	1	0	1
biface	0	0	2	0	2
chopper	0	0	8	0	8
combination tool	0	0	1	0	1
complex scraper	0	0	6	0	6
crushing/battering	0	0	5	0	5
denticulate	0	0	1	0	1
drill	0	0	1	0	1
early stage biface	1	1	26	1	29
edge modified	0	0	32	0	32
end scraper	0	0	19	0	19
graver	0	0	3	0	3
hammerstone	0	0	2	0	2
late stage biface	1	3	102	0	106
metate	0	1	1	0	2
middle stage biface	1	3	38	0	42
other tool	0	0	5	0	5
preform	0	1	47	0	48
side scraper	0	0	17	0	17
spokeshave	0	0	1	0	1
uniface	3	7	61	0	71
utilized flake	3	0	95	0	98
wedge	1	0	8	0	9
Total	10	16	482	1	509

Only one projectile point (an untyped dart point) was recovered from the burned rock pavement features, but the association of these pavements with the middens suggests that they may span a similar time range. The sparse sample of projectile points recovered from the upland mounds (see Table 9.4) all represent dart points that are either untyped or occur throughout the Archaic (Turner and Hester 1993), and thus it provides little information on the age of these features. Interestingly, the four points associated with burned rock concentrations are either relatively old (Paleoindian and Early Archaic) or untypeable. This may suggest that many of the amorphous concentrations are the remnants of relatively old features. However, the radiocarbon data suggest that this is not always the case, particularly in the case of concentrations from sites on the Paluxy Sand substrate (see section 9.1.6).

The tool sample from the middens (see Table 9.5) exhibits considerable diversity, with scraping, cutting, chopping, and puncturing tools of both deliberate and expedient manufacture all occurring in appreciable numbers. The most common tools are late-stage bifaces (which may often represent finished cutting or perforating tools), preforms, utilized flakes, unifacial cutting and scraping tools, and bifaces in earlier stages of manufacture. No tool type associated with any of the other feature types is missing from the midden assemblage, suggesting that the toolkit represents a full range of activities. In contrast, only a limited range of tools, consisting of a few bifaces, unifaces, utilized flakes, and one wedge, were recovered from the upland mounds. Concentrations also yielded a smaller range of tools, including one drill, bifaces in various stages of manufacture, and unifacial cutting and scraping tools. The tool sample recovered from the pavements was limited to a single early stage biface.

Faunal remains are more common from middens than from any other context investigated on the fort, with the exception of a few of the richer rockshelters. Table 9.6 illustrates aggregate faunal return from the mounds, middens, concentrations, and pavements (note that unlike Table 9.4, this table excludes the small, unidentifiable bone fragments recovered from flotation). As Table 9.6 illustrates, over 97% of the material recovered from the large burned rock features were associated with middens. Although a variety of taxa are represented, almost 80% of the sample is from relatively large animals, including deer and bison. While some of the wide variety of smaller animals probably represent intrusives, it is likely that the majority of remains are in fact the residue of economic activity. In contrast, faunal recovery from the concentrations and pavements was relatively low, although the small sample of pavements limited the potential for recovery. In both cases, most identifiable remains represent relatively large animals (deer, other Artiodactyls, and deer-sized animals). No bone was recovered from any of the eight mounds investigated.

Floral remains from the middens (Table 9.7) are low, partly because only a limited suite of the collected and processed samples were analyzed (see section 4.3). Surprisingly, the majority of recovered remains are uncarbonized, suggesting that they represent intrusive materials. Carbonized remains of probable cultural affiliation include one charred hackberry seed, a charred juniper needle, a charred seed from *Opuntia* sp. cactus, and burned oak and unidentified wood fragments. In short, while there does seem to be some preservation of floral remains in the middens, more work is necessary before any suggestions can be made concerning its significance. Similarly, floral remains were also recovered in low frequency from the concentrations, and less than half of the recovered sample was carbonized. The most common carbonized material was oak wood, which presumably represents a fuel. The floral remains from the mounds were limited to a few uncarbonized seeds, nuts, and wood fragments, all of which are probably intrusive and thus have no bearing on function. No floral remains were recovered from the pavements.

9.1.4.2 Hearths

Table 9.8 lists the cultural material associated with each hearth. The following discussion generalizes the range of activities associated with different hearth types rather than assessing them on a specific, hearth-by-hearth basis. Of the 12 Type 1 hearths, three had no cultural material in association (two of these were exposed in trench profiles and unexcavated). Within the artifact assemblage from the remaining Type 1 hearths, lithics comprised over 60% of all recovered items. The disproportionate numbers of interior (noncortical) flakes suggests that the very early stages of lithic reduction were not associated with these hearths. Solely from a morphological aspect, most tools were expedient cutting and scraping implements. Even though the recovered cultural material is dominated by debitage, the presence of other artifact classes (e.g., lithic tools, faunal remains) suggests that Type 1 hearths are associated with a range of activities.

Table 9.6 Frequency of Faunal Remains from Burned Rock Features.

Common Name	Taxon	Element	Burned Rock Feature Type			
			Mound	Concentration	Midden	Pavement
Bison/Cow	*Bos/Bison*	permanent tooth	0	0	3	0
		tibia	0	0	2	0
		tooth	0	0	7	0
		Subtotal	0	0	12	0
Deer	*Odocoileus* sp.	antler	0	0	5	0
		calcaneus	0	0	1	0
		distal phalange	0	0	6	0
		fused central carpal	0	0	2	0
		humerus	0	0	3	0
		mandible	0	0	1	0
		middle phalange	0	0	1	0
		pelvis	0	0	1	0
		permanent tooth	0	0	20	1
		proximal phalange	0	0	1	0
		radius	0	0	3	0
		scapula	0	0	1	0
		tibia	0	0	4	0
		tooth	0	2	6	0
		Subtotal	0	2	55	1
Even-toed Ungulates	Artiodactyla	accessory carpal	0	0	1	0
		astragalus	0	0	3	0
		calcaneus	0	0	1	0
		cervical vertebra	0	0	1	0
		cranium	0	0	1	0
		distal phalange	0	0	1	0
		femur	0	0	5	0
		fused 2 & 3rd carpal	0	0	3	0
		fused 3 & 4th carpals	0	0	2	0
		fused 3 & 4th metatar	0	1	29	0
		humerus	0	0	7	0
		mandible	0	0	3	0
		metapodial	0	0	16	0
		middle phalange	0	0	8	0
		pelvis	0	0	2	0
		permanent tooth	0	0	1	0
		phalange	0	0	1	0
		proximal phalange	0	0	15	0
		radius	0	0	4	0
		rib	0	0	1	0
		scapula	0	0	1	0
		thoracic vertebra	0	0	1	0

(Continued)

Table 9.6 Continued.

Common Name	Taxon	Element	Burned Rock Feature Type: Mound	Concentration	Midden	Pavement
Even-toed Ungulates	Artiodactyla	tibia	0	0	8	0
		tooth	0	0	1	0
		ulna	0	0	3	0
		vertebra	0	0	4	0
		Subtotal	0	1	123	0
Unidentified, bison-sized	Mammalia	indeterminate	0	0	4	0
		long bone	0	0	1	0
		Subtotal	0	0	5	0
Unidentified, deer/bison sized	Mammalia	indeterminate	0	0	4	0
		tooth	0	0	1	0
		Subtotal	0	0	5	0
Unidentified, dog/deer sized	Mammalia	cranium	0	0	2	0
		indeterminate	0	32	1,896	8
		long bone	0	0	10	0
		podial	0	0	1	0
		rib	0	0	4	0
		scapula	0	0	1	0
		tooth	0	0	1	0
		vertebra	0	0	9	0
		Subtotal	0	32	1,924	8
Rabbits & Hares	Leporidae	deciduous tooth	0	0	1	0
		mandible	0	0	1	0
		permanent tooth	0	0	1	0
		radius	0	0	1	0
		Subtotal	0	0	4	0
Jackrabbit	*Lepus californicus*	humerus	0	0	1	0
		permanent tooth	0	0	1	0
		radius	0	0	3	0
		Subtotal	0	0	5	0
Cottontail Rabbit	*Sylvilagus* sp.	cranium	0	0	1	0
		humerus	0	0	1	0
		mandible	0	0	1	0
		metatarsal	0	0	1	0
		metatarsal 3	0	0	1	0
		pelvis	0	0	5	0
		permanent tooth	0	0	4	0
		Subtotal	0	0	14	0
Wood Rat	*Neotoma* sp.	humerus	0	0	1	0
Carnivores	Carnivora	permanent tooth	0	0	1	0
Opossum	*Didelphis virgiania*	humerus	0	0	1	0
Pocket Gopher	*Geomys bursarius*	humerus	0	0	2	0
		radius	0	0	1	0
		Subtotal	0	0	3	0

Table 9.6 Concluded.

Common Name	Taxon	Element	Burned Rock Feature Type: Mound	Concentration	Midden	Pavement
Raccoon	*Procyon lotor*	humerus	0	0	1	0
		permanent tooth	0	0	1	0
		Subtotal	0	0	2	0
Unidentified, Rat-sized Rodent	Rodentia	humerus	0	0	1	0
		scapula	0	0	1	0
		Subtotal	0	0	2	0
Squirrels & Chipmunks	Sciuridae	mandible	0	0	1	0
		permanent tooth	0	0	2	0
		Subtotal	0	0	3	0
Cotton Rat	*Sigmondon* sp.	permanent tooth	0	0	1	0
Unidentified, dog-sized	Mammalia	tibia	0	0	2	0
		unidentified long bone	0	0	1	0
		Subtotal	0	0	3	0
Unidentified, rabbit-sized	Mammalia	cranium	0	0	2	0
		indeterminate	0	0	2	0
		metapodial	0	0	1	0
		Subtotal	0	0	5	0
Unidentified	Mammalia	indeterminate	0	0	57	0
Birds	Aves	humerus	0	1	0	0
		indeterminate	0	1	0	0
		vertebra	0	2	0	0
		Subtotal	0	4	0	0
Turkey-sized Birds	Aves	cervical vertebra	0	0	1	0
		long bone	0	0	1	0
		tibiotarsus	0	0	0	1
		Subtotal	0	0	2	1
Toads & Frogs	Anura	long bone	0	0	1	0
		tibiofibula	0	0	1	0
		Subtotal	0	0	2	0
Colubrid snakes	Colubridea	dorsal vertebra	0	0	1	0
Turtle	Testudinata	neural	0	0	1	0
		peripheral	0	0	2	0
		plastron	0	0	1	0
		carapace	0	0	19	0
		Subtotal	0	0	23	0
Softshell Turtle	*Trionyx* sp.	carapace	0	0	1	0
Gar	*Lepisosteus* sp.	ganoid scale	0	0	1	0
		metacarpal	0	0	1	0
		Subtotal	0	0	2	0
Small Fish	Osteichthyes	cranium	0	0	1	0
Indeterminate	Vertebrata	indeterminate	0	30	398	1
		long bone	0	0	5	0
		carapace	0	0	5	0
		Subtotal	0	30	408	1
Grand Total						2,747

Table 9.7 Floral Remains from Burned Rock Features.

Common Name	Taxon	Part	Burned Rock Feature Type: Mound (n=3)	Concentration (n=6)	Midden (n=19)	Pavement (n=1)	Total
UNCARBONIZED							
Pepper vine	*Ampelopsis* sp.	Seed	1	0	0	0	1
Netleaf Hackberry	*Celtis reticulata*	Seed	0	0	0	1	1
Croton	*Croton* sp.	Seed	1	0	0	0	1
Sedge family	Cyperaceae	Seed	0	0	1	0	1
Bedstraw	*Galium* sp.	Root	0	1	0	0	1
		Seed	0	3	1	0	4
unknown	Indeterminate	Bark	0	0	3	0	2
		Fruit	0	0	1	0	1
		Root	0	0	3	0	3
		Seed	0	0	2	0	2
		Stem	0	0	1	0	1
		Wood	0	0	1	0	1
Juniper	*Juniperus* sp.	Flower	0	0	1	0	1
		Leaf	0	0	1	0	1
		Wood	1	0	0	0	1
Ashe Juniper	*Juniperus ashei*	Leaf	0	0	1	0	1
		Seed	0	0	1	0	1
Grass family	Poaceae	Seed	1	0	0	0	1
Oak sp.	*Quercus* sp.	Nut	1	0	2	0	3
		Wood	0	0	1	0	1
Cedar Elm	*Ulmus crassifolia*	Fruit	0	0	1	0	1
Uncarbonized Subtotal			5	4	21	1	31
CARBONIZED							
Netleaf Hackberry	*Celtis reticulata*	Seed	0	0	1	0	1
unknown	Indeterminate	Wood	0	0	2	0	2
Ashe Juniper	*Junperis ashei*	Leaf	0	1	1	0	2
Prickly Pear	*Opuntia* sp.	Seed	0	0	1	0	1
Live Oak	*Quercus* sp.	Wood	0	2	3	0	5
Carbonized Subtotal			0	3	8	0	11
Grand Total			5	7	29	1	42

Note: n = number of flotation samples analyzed from each context

Table 9.8 Material Remains Associated with Hearth Features.

Hearth Type Site	Feature Number	Lithic Point	Lithic Tool	Lithic Core	Lithic Debitage	Historic	Carbonized Plant Taxon	Bivalve Taxon	Bone Taxon	Rock Weight (kg)	Rock Count	Comments
1 (Flat, angular rock/cobble layered)												
41BL154	2	0	11	0	133	0	-	-	Testudinata Mammalia (lg) Artiodactyla *Odocoileus* sp.	4.5	20	
41BL339	1	0	0	0	0	0	-	-	-	0	0	unexcavated
41BL567	1	7	4	0	467	0	*Juglans* sp. (nut) *Juniperus* sp. (wood) *Quercus* sp. (wood) *Carya illinoiensis* (wood)	unidentified	Mammalia (lg) Osteichthyes (sm)	20	9	
41CV1105	2	0	0	0	0	0	-	-	-	0	0	unexcavated
41CV1136	6	0	0	0	1	0	-	-	-	7	33	
41CV95	3	0	0	0	9	0	-	Lampsilinae	-	3	11	
41CV95	4	1	1	0	14	0	-	-	Mammalia (lg)	19	99	
41CV95	7	0	1	0	0	0	*Quercus* sp. (wood)	*Toxolasma* sp. Lampsilinae Ambleminae	-	6	18	
41CV960	1	0	1	0	4	0	-	Lampsilinae	-	8	43	
41CV97	11	0	0	0	0	0	-	-	-	4	14	
41CV97	13	0	0	0	3	0	-	-	Mammalia (lg) *Odocoileus* sp.	1	22	
41CV97	9	0	1	1	112	0	-	Lampsilinae Ambleminae	Mammalia (lg)	8	33	
2 (Flat, slab layered)												
41BL538	1	0	0	0	0	0	-	-	-	0	0	unexcavated
41CV95	10	0	0	0	2	0	-	Ambleminae *Quadrula* sp. Lampsilinae	unidentified	14.5	25	
3 (Basin, little or no rock)												
41BL567	2	0	0	0	0	0	Indeterminate (wood)	-	-	0	0	
41CV1200	3	0	0	0	0	0	-	-	-	0	0	
41CV97	4	0	0	0	4	0	*Ulmus* sp. (wood)	-	Mammalia (lg)	0	0	
41CV1085	1	2	4	0	139	0	-	*Quadrula* sp.		0.8	3	
41CV97	16	0	1	0	64	0	*Quercus* sp. (wood)	-	Mammalia (lg) Artiodactyla	0	0	
41CV97	17	0	0	0	4	0	-	-		0	0	
41CV97	5	0	3	0	228	0	*Quercus* sp. (wood)	Lampsilinae	Mammalia (lg) Artiodactyla	1	1	

Table 9.8 Concluded.

Hearth Type Site	Feature Number	Lithic Point	Lithic Tool	Lithic Core	Lithic Debitage	Historic	Carbonized Plant Taxon	Bivalve Taxon	Bone Taxon	Rock Weight (kg)	Rock Count	Comments
4 (Basin, angular rock/cobble layered)												
41BL339	4A	0	2	1	22	0	*Quercus* sp. (wood)	Lamsilinae Ambleminae	Mammalia (lg) *Odocoileus* sp.	28	62	
41CV1027	3	1	0	0	1	0	-	-	-	28.9	72	
41CV1038	3	2	1	0	24	0	-	-	Mammalia (lg) Bos/Bison	29.3	56	
41CV1038	4	0	0	0	7	0	*Quercus* sp. (wood)	-	Mammalia (lg)	35	105	
41CV1038	6	0	0	0	0	0	-	-	-	29.3	99	
41CV1105	1	0	0	0	84	0	-	Lamsilinae Ambleminae	-	17	46	
41CV1105	4	1	0	0	7	0	-	-	-	1	8	
41CV1200	2	0	0	0	9	0	-	Lampsilinae	Mammalia (lg)	314.9	700	
41CV174	10	0	5	0	87	0	-	-	Artiodactyla	9	32	
41CV174	2	0	0	0	0	0	-	-	-	0	0	unexcavated
41CV174	4	0	0	0	0	0	*Carya* sp. (wood)	-	-	2	5	
41CV587	2	2	2	0	430	20	-	unidentified	Mammalia (lg) Bos/Bison	76.5	229	
41CV95	5	1	0	0	20	0	*Quercus* sp. (wood)	-	-	3.5	21	
41CV960	2	0	0	0	56	0	-	Lamsilinae Ambleminae	Mammalia (lg)	83	252	
41CV97	12	0	0	0	0	0	-	unidentified	Mammalia (lg)	34	75	
41CV97	15	1	0	0	2	0	-	-	Mammalia (lg)	0.5	2	
41CV97	7	0	1	0	4	0	-	-	Mammalia (lg)	18.4	76	
5 (Basin, slab layered)												
41BL339	2	0	0	0	27	0	-	*Quadrula* sp. Lampsilliae *Toxolasma* sp.	Testudinata Mammalia (lg)	34	91	
41CV1136	5	0	0	0	3	0	-	-	-	9.5	28	
41CV1391	2	1	0	0	14	0	*Quercus* sp. (wood)	-	-	10	218	
41CV174	3	0	0	0	0	0	-	-	-	45	119	
41CV174	5	0	1	0	0	0	-	-	-	46	140	
41CV174	7	2	1	0	7	0	-	-	Mammalia (lg) *Odocoileus* sp.	17	77	
41CV174	8	0	0	0	0	0	*Quercus* sp. (wood)	-	-	89.5	269	
41CV97	19	0	3	0	26	0	-	unidentified	*Bufo* sp. Mammalia (lg) *Odocoileus* sp.	5	40	
6 (Dispersed)												
41CV97	10	0	2	0	45	0	-	-	Mammalia (lg) *Castor canadensis*	0	0	

A shell concentration was encountered directly beneath the burned rocks of the only Type 2 hearth formally excavated (F 10, 41CV95). Food preparation and consumption, with the probable exploitation of Cowhouse Creek as a resource, is evidenced by this hearth.

All but one Type 3 hearth had cultural material noted in association. Within the artifact assemblage, lithic material was ubiquitous, accounting for 90% of all recovered items. As with Type 1 hearths, lithic debitage was representative of later stage reduction (noncortified flakes).

From the sample of 17 Type 4 hearths, one unexcavated and two excavated (18%) features had no cultural material in association, and eight hearths (47%) had low artifact counts (fewer than 25 items each). From the remaining 35% (6 hearths), artifact counts ranged from approximately 60 to 500 artifacts per hearth. Based on an overall high frequency of debitage, lithic reduction was a main focus; however, the presence of other artifact classes, including bison bone (F 3, 41CV1038) and shell (F 1, 41CV1105) suggest food processing and consumption was involved as well.

Sixty-three percent of Type 5 hearths had only lithics (fewer than 20 per feature) or no cultural material in association. Three had comparable or greater ratios of bone (including deer and large mammal) to lithics, suggesting faunal processing and related subsistence activities.

Based on artifact recovery, activities associated with the one Type 6 hearth noted in this study include lithic reduction and possibly food processing (based on faunal remains).

9.1.5 Geographic Setting of Features

The 57 tested sites included 69 mounds, middens, concentrations, and pavements from 32 sites (56% of the total). These 69 features included 31 middens, four domed mounds, four annular mounds, four pavements, and 26 concentrations. As illustrated in Table 9.1, these four different burned rock feature types were unevenly distributed across the landscape (Table 9.9). Although the sample is small and possibly skewed, several general trends are apparent.

With the exception of one feature in the Paluxy Sand environment (41CV1027, F 1), the burned rock mounds (both domed and annular) were

Table 9.9 Geomorphic Settings of Burned Rock Features.

		Burned Rock Feature Type			
		Mound	Midden	Concentration	Pavement
DEPOSITIONAL SETTINGS					
Lowland	Holocene terrace	0.0%	25.0%	69.0%	25.0%
	colluvial slope/ toeslope	0.0%	15.6%	0.0%	50.0%
	Holocene terrace/colluvial toeslope	0.0%	37.5%	0.0%	25.0%
	Subtotal	0.0%	78.1%	69.0%	100.0%
Upland	Paluxy substrate	12.5%	18.8%	23.0%	0.0%
STABLE SETTINGS					
Lowland	Pleistocene terrace	12.5%	3.1%	7.6%	0.0%
Upland	Stable Manning upland margin	75.0%	0.0%	0.0%	0.0%

situated in non-depositional environments. Six of the features (75%) were situated on stable portions of the Manning surface near the escarpment edge, while one (12.5%) was situated on a stable to erosional high Pleistocene terrace. In contrast, the middens, burned rock concentrations, and pavements were located primarily in depositional lowland settings. The majority of middens (78%) were situated either within Holocene alluvial deposits, Holocene colluvial toeslope deposits, or spanning the alluvial/colluvial boundary. Five others (approximately 19%) were in the Paluxy Sand environment, and had a relatively low artifact content (see section 9.6), suggesting that they may represent a different type of phenomenon than the alluvial/colluvial middens. From the present data, most burned rock concentrations do not appear to be either disturbed mounds or mounds in the initial stages of development. The small percentage of middens (19%) and burned rock concentrations (23%) in the uplands were usually associated with the Paluxy Sand substrate. The large midden deposits were often (37.5%) located at the terrace/colluvial toeslope interface, with some (25%) strictly on the terrace and others (15.6%) restricted to the colluvial toeslope. The burned rock features in the lowlands tended to be located along larger streams (70%) rather than along smaller tributaries (30%).

The majority of hearths (n=41; 89%) were situated on (or rather, buried within) open alluvial terraces. Two additional hearths were discovered buried in the Paluxy Sand deposits in the uplands, and three others were found within rockshelters (Table 9.10).

9.1.6 Ages of the Tested Burned Rock Features

9.1.6.1 Mounds, Middens, Concentrations, and Pavements

A total of 31 radiocarbon ages were obtained from 24 of the large and/or amorphous burned rock features during the current study (Figure 9.3). The charcoal ages range from a low of 110 BP to a high of 5240 BP. The majority (n=20; 65%) of assays were from midden deposits, while ten (33%) were from the mounds (including seven ages from the previously published investigations of 41CV1027 and 41BL743 [Quigg and Ellis 1994]), and only one from a burned rock concentration. In addition, a total of 14 *Rabdotus* sp. snails were submitted for A/I analysis from two different mound contexts and 58 additional specimens were submitted from seven distinct midden contexts. While more ambiguous than the radiocarbon data (see section 9.5), regression of these shells with others of known radiocarbon age does provide some additional chronometric information.

The absolute radiocarbon assays from the tested burned rock middens reveal periodic use of middens during the last 5500 BP. The majority of assays (60%) between 900 and 2000 BP; five (25%) are greater than 2000 BP; and three (15%) fall between 100 and 700 years BP. The clustered assays suggest a relatively intensive period of midden use at Fort Hood during the latter Archaic and earlier Late Prehistoric periods, which generally agrees with the recovered projectile point assemblage (see section 9.1.4). The smaller A/I sample addressed seven different features, and yielded interpreted ages of approximately 500 BP to 3400 BP, with four clustered in the radiocarbon-dated peak between approximately 1100 BP and 2000 BP, and two others clustered at around 3300 BP. The one charcoal assay from a burned rock concentration, 1310 BP, falls within the period of intensive use of middens as identified above.

The ten assays obtained from the mounds encompass only four individual features, three of which are represented by multiple assays. Collectively, these mounds date to between 200 to 4500 BP, with half of the ages post-dating 1000 BP and half predating 3000 BP. An additional indication of the age of one of the radiocarbon-dated features (41BL198, F 1) and a first approximation of the age of another, undated feature (41BL198, F 2), is provided by clustered amino acid racemation ratios on *Rabdotus* sp. Interestingly, the undated feature yielded an approximate radiocarbon-equivalent age of around

Table 9.10 Dating of Hearth Features.

Hearth Type Site	Feature Number	C-14 Date	Depositional context	Diagnostics Type	Diagnostics Cultural Period	Comments
1 (Flat, angular rock/cobble layered)						
41BL154	2	8600 ± 50	Georgetown alluvium	-		
41BL339	1	1460 ± 60	upper West Range alluvium	-		
41BL567	1	790 ± 50	rockshelter	Scallorn (3) Darl, Other Arrow (2), Other Dart	Transitional Archaic to Late Prehistoric	
41CV95	3	1410 ± 60	West Range alluvium	-		
41CV95	4	1080 ± 60	West Range alluvium	Other Arrow	Late Prehistoric	
41CV95	7	-	West Range alluvium	-		
41CV97	9	2900 ± 70	West Range alluvium	-		
41CV97	11	-	West Range or Ft. Hood alluvium	-		
41CV97	13	-	West Range? alluvium	-		
41CV960	1	-	West Range? alluvium	-		
41CV1105	2	-	alluvium (prob West Range)	-		
41CV1136	6	-	West Range alluvium	-		
2 (Flat, slab-layered)						
41BL538	1	-	rockshelter	-		
41CV95	10	-	West Range alluvium	-		
3 (Basin, little or no rock)						
41BL567	2	790 ± 50	rockshelter	-		
41CV97	4	690 ± 70	Ford Alluvium	-		
41CV97	5	-	Ford Alluvium	-		
41CV97	16	-	West Range? alluvium	-		
41CV97	17	-	West Range alluvium	-		
41CV1085	1	380 ± 70	rockshelter	Perdiz, Other Arrow	Late Prehistoric	Date from 10 cm above feature
41CV1200	3	-	West Range alluvium	-		
4 (Basin, angular rock/cobble layered)						
41BL339	4A	1270 ± 120	upper West Range alluvium	-		
41CV95	5	-	West Range? alluvium	Ensor (2)	Transitional Archaic	
41CV97	7	-	West Range? alluvium	-		
41CV97	12	-	West Range? alluvium	-		
41CV97	15	-	West Range? alluvium	Edgewood	Transitional Archaic	
41CV174	2	-	West Range? alluvium	-		
41CV174	4	541 ± 50	Ford	-		
41CV174	10	-	Fort Hood? alluvium	-		
41CV587	2	260 ± 70	Ford Equivalent	Ensor (2)	Transitional Archaic	
41CV960	2	3200 ± 60	West Range? alluvium	-		
41CV1027	3	-	Paluxy Upland	Other Arrow	Late Prehistoric	

Table 9.10 Concluded.

Hearth Type Site	Feature Number	C-14 Date	Depositional context	Diagnostics Type	Diagnostics Cultural Period	Comments
4 (Basin, angular rock/cobble layered)						
41CV1038	3	361 ± 34	Ford Alluvium	Perdiz, Other Arrow	Late Prehistoric	
41CV1038	4	-	Ford Alluvium	-		
41CV1038	6	3720 ± 60	Lower West Range alluvium	-		
41CV1105	1	-	West Range? alluvium	-		
41CV1105	4	-	West Range? alluvium	Yarbrough	Archaic	
41CV1200	2	1260 ± 60	West Range	-		Date of 1240 ± 60 obtained from 20 cm above feature
5 (Basin, slab-layered)						
41BL339	2	-	upper West Range alluvium	-		
41CV97	19	-	West Range alluvium	-		
41CV174	3	1874 ± 87	West Range alluvium	-		
41CV174	5	1910 ± 60	West Range alluvium	-		
41CV174	7	1650 ± 60	West Range alluvium	Ensor Edgewood	Transitional Archaic	
41CV174	8	-	West Range alluvium	-		
41CV1136	5	-	West Range alluvium	-		
41CV1391	2	-	Paluxy Upland	Other Arrow	Late Prehistoric	
6 (Dispersed)						
41CV97	10	2890 ± 60	West Range alluvium	-		

7000 BP, which is considerably older than any of the radiocarbon ages on mounds obtained in this study and the majority reported in Quigg and Ellis (1994), while the other, dated feature yielded an approximate radiocarbon-equivalent age of around 3300 BP, which is roughly 3,000 years older than the radiocarbon age from the same feature. This suggests that the snails may exhibit an age anomaly due to heating. Although this is only speculative, it may be that moderate, sustained heat in the body of the mound resulted in a consistent, moderate increase in racemization rate that resulted in smaller, more clustered thermal skewing of the A/I ratios than is typically imparted by exposure to open flame.

Collectively, the range of chronometric mound ages recognized in this report and in Quigg and Ellis (1994) is considerably wider than is typically recognized in Central Texas (e.g., Prewitt 1981). Reuse of features also seems to occur, as the data indicate that one mound at 41BL743 was used at least three times between 640 to 3200 BP. Although the chronometric data is tantalizing, sufficient information to identify any particular periods of intensive use or "abandonment" in the region does not exist at present.

Comparison of the burned rock mound ages presented by Quigg and Ellis (1994:204-273) and the midden data presented here, reveal no significant age difference between these two types of burned rock features. The 30 plus absolute

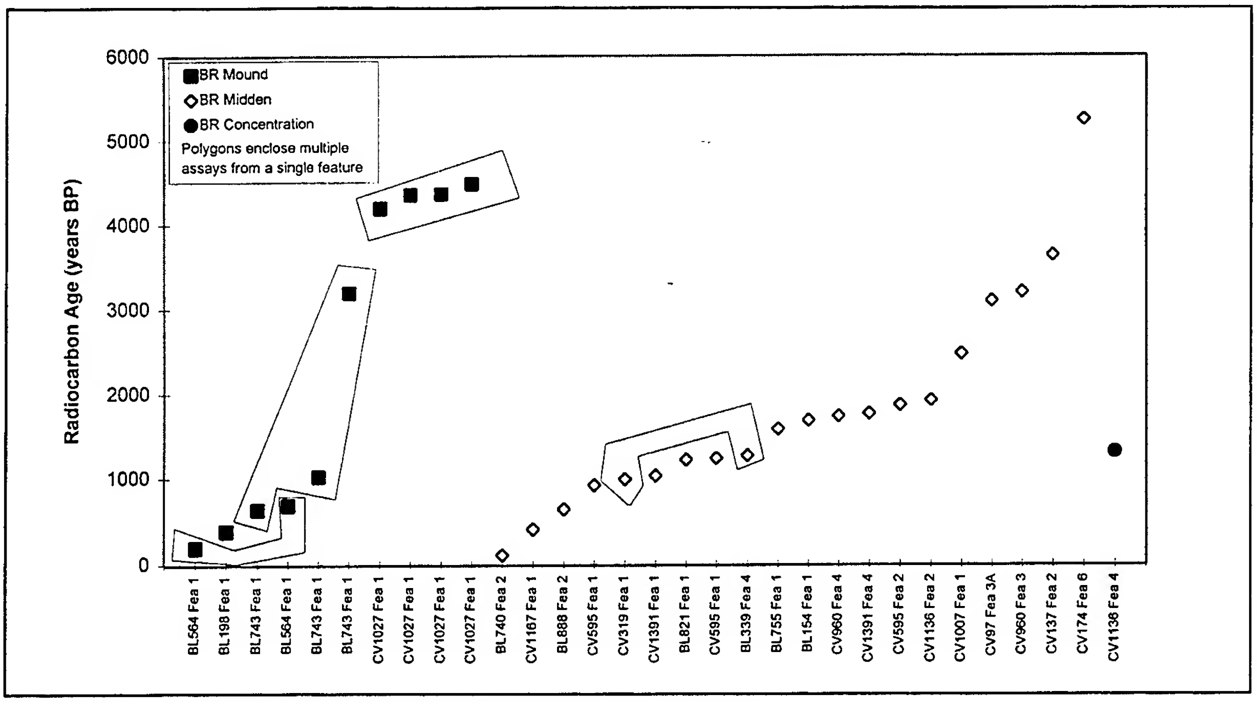

Figure 9.3 Radiocarbon Ages from Burned Rock Features.

mound ages presented by Quigg and Ellis (1994:204-273) do not cluster as the midden ages do here. At present the burned rock mounds and middens are more prevalent during the last 2,000 years which immediately follows an apparent low use episode of about 500 years. As the charcoal assay data base for burned rock features increases, the ability to identify periods of intense use, or lack of use, will become more obvious.

9.1.6.2 Hearths

Relative and absolute dating techniques were employed in ascertaining the ages of the investigated hearths (see Table 9.10). Temporal assignments were ascribed to particular hearths based on radiometric ages, the recovery of associated diagnostics, and stratigraphic context (Nordt 1992; Abbott 1994:25-31).

The sample of Type 1 hearths suggests use during the late Paleoindian-Early Archaic, and more extensively, from the Late Archaic into the Late Prehistoric (i.e., Austin Phase). At 41BL567, F 1 was associated with both arrow and dart points. The recovered dart points may represent heirloom projectiles collected for subsequent reuse. The Type 1 hearth described herein closely resembles Weir's Type 4 (1976) in morphology and later temporal sequencing. Although poorly represented in this sample, an earlier predilection for this hearth type may become more apparent.

The only temporal designation afforded Type 2 hearths is a stratigraphic unit probably correlating to the West Range Alluvium.

The alluvial deposits containing Type 3 hearths were variously identified as the Ford or West Range fills; however, in three of five cases, the stratigraphic assignment was only tentative. In addition, no diagnostics were recovered from Type 3 hearths in terrace settings, but one radiocarbon assay (F 4, 41CV97) dated to 690 ± 70 BP. At 41BL567, F 2 (a Type 3 hearth) was associated with F 1 (a Type 1 hearth), suggesting that multiple styles were constructed by the same people. In general, Type 3 hearths are present

during the Late Prehistoric and, based on stratigraphic context, may temporally include the Late and Transitional Archaic. The examples of Type 3 are physically similar to Type 1 described by Weir (1976). Weir, however, states that these hearths are small, whereas not all of this study's Type 3 hearths can be categorized as such. In addition, Weir assigns these features to his Twin Sisters phase (2000 to 700 BP). Although no Type 3 hearths can be temporally correlated to Weir's sample, their existence in the later phases of the Archaic is possible based on stratigraphic context.

Most Type 4 hearths were contained within in the Ford or West Range fills, with stratigraphic assessment problematic for some. Based solely on temporal diagnostics, three hearths spanned the Middle through Transitional Archaic. Although an untyped arrow point was associated with a hearth at 41CV1027, context was dubious since the point was recovered from the surface. In addition, a colluvial cap containing recent material indicated that the upper 20 cm of deposit containing F 2 (41CV587) was disturbed.

Type 4 hearths can be attributed to the Middle Archaic through the Late Prehistoric, and possibly overlap into the Historic. These hearths clearly correspond to Weir's Type 2 in both morphology (except for size, which cannot be fully addressed in the Fort Hood sample) and site location. Weir states that most of his Type 2 hearths occur in open terrace settings and sometimes within burned rock middens (1976:41); this holds true for the majority of Type 4 hearths in the present sample. In addition, the Type 4 hearths temporally correspond with the Twin Sisters (2000 to 700 BP) and San Marcos (2800 to 1800 BP) phases assigned by Weir to his Type 2 hearths.

Depositional context of all Type 5 hearths buried in terrace settings was identified, or tentatively ascribed, as the West Range Alluvium. The radiocarbon assay sample indicates a strong predisposition for hearth Type 5 during the Transitional Archaic. This type probably extends into the early Late Prehistoric (Austin Phase) based on the recovery of an arrow point and inclusion of an Upper West Range unit on terrace sites. Hearth Type 5 is similar to Weir's Type 3 in that both are basin shaped, slab lined, potentially multi-layered, and in some cases, contained in midden deposits. Based on Weir's chronology, these hearths were common during the San Marcos (2800 to 1800 BP) and Twin Sisters (2000 to 700 BP) phases, and were present up to historic times. This is consistent with the temporal data from Type 5 hearths investigated during this phase of work.

The single Type 6 hearth was temporally assigned to the Late Archaic based on depositional context and one radiocarbon assay.

9.1.7 Conclusions

As the above summary demonstrates, while there are many different types of features associated with prehistoric archeological sites on Fort Hood, the majority are thermal features composed of burned rock, ash, and/or burned earth. One of the most important conclusions of the study is the recognition of several very different types of features in a category that has hitherto been lumped under the rubric of burned rock middens. While we feel that even this distinction is simplistic--there are at least two distinct types of burned rock mounds, and probably several different types of burned rock middens--drawing a distinction between burned rock middens and burned rock mounds is an essential step in deciphering the significance of these enigmatic features.

Collectively, the character of the majority of burned rock mounds addressed in the current study is somewhat (although not convincingly) suggestive of a technology involving the preparation of vegetal resources. The frequent presence of centralized, internal features and/or pits or bedrock depressions is suggestive of the earth oven interpretation, and the clast-supported character of the matrix suggests that many of the features were constructed through the placement of individual clasts, with the fine matrix infiltrating

later, rather than dumping of volumes of mixed coarse and fine matrix. However, this does not always appear to have been the case, particularly for the mound identified in the Paluxy Sand environment (41CV1027, F 1). The low artifact return from the mounds suggests a limited suite of activities are represented (although there are exceptions), while the total lack of bone suggests that faunal processing was not involved. However, the suite of recovered floral remains is also quite sparing, and composed entirely of uncarbonized remains that probably represent intrusives (see Table 9.7). Therefore, it is possible that bone and/or macrobotanical remains were originally present but did not survive due to inhospitable soil chemistry. While the soil is theoretically mildly to moderately alkaline, and should therefore be relatively conducive to preservation of bone, soil chemistry studies, including pH determinations and measures of total and available phosphate, would be a highly illuminating avenue of investigation (Collins 1991).

Middens, in contrast, frequently contain a rich and diverse suite of associated materials that suggest that they probably represent the remains of a variety of activities. The mixed clast- and matrix-support of the typical midden is consistent with dumping of material, and the diverse artifact suite suggests that they may frequently represent generalized refuse piles, much as has been proposed by Sorrow (1969). The toeslope position of many of the features may indicate that they represent dumps at the rear of occupation sites on the terraces (most probably now buried), and suggests that they will not be fully understood until investigations are broadened to encompass these areas (which may be relatively subtle if most of the refuse on the site was transferred to the midden). However, the presence of internal features in some of the middens implies that this model is insufficient to explain the full range of variation. Also, the geography of some of the toeslope middens argues against the model indicated. For example, the midden at 41CV137 does not open onto a large terrace (the entire valley is only 30 to 40 m wide), but extends more than 25 m up an 18° slope, which is hardly consistent with a refuse dump at the rear of a terrace occupation. In addition, the middens associated with the Paluxy Sand sites are of wholly different character, both in terms of landscape position and artifact content (see section 9.5), suggesting that they represent a distinct phenomenon. Therefore, the most promising avenues of research are focused, detailed multidisciplinary studies (cf. Collins 1991) coupled with a sensitivity to broader issues of landscape setting, morphology, and artifact content that appear to separate what remain a poorly understood and hitherto aggregated suite of prehistoric features.

Apart from rockshelters, burned rock middens are the richest and most visible archeological manifestations on Fort Hood. As such, they are also one of the most vulnerable to vandals. Virtually all of the large middens we examined were potted to some degree, and some appear to have been effectively strip-mined by organized teams of collectors to recover all the arrowheads and other collectable artifacts. Damage by plowing is also occasionally apparent. Mounds, in general, are not as severely impacted. Whether this is a function of their location or a recognition of their lower artifact content by vandals is unclear, although the latter is considered more likely. The features least vulnerable to vandals are interstratified in the deep alluvial valleys, where discovery is difficult and the effort required to loot the sites appears to far outstrip the return. However, even these features are vulnerable to large-scale earthmoving by the army and cutbank erosion, and thus cannot be considered free from potential impact. In any case, the burned rock features on Fort Hood represent an immensely valuable and highly vulnerable archeological resource. Our experience during the testing phase suggests that vandalism of the shelters and middens is ongoing.

Although the relatively extensive character of this investigation was valuable in that it facilitated recognition of key differences between burned rock

mounds and burned rock middens, this same characteristic served as an impediment to effective investigation of the features. One of the most difficult problems proved to be distinguishing between intact and disturbed portions of the large burned rock features. Both consist largely of structureless jumbles of rock and very dark fine matrix, and intrusive pits proved very hard to identify. While cohesiveness of the matrix often can provide a clue, particularly within the context of any individual feature, the temptation to view all features with friable matrices as largely disturbed should be avoided, as it is almost certainly wrong. The same characteristics that make disturbance difficult to identify contribute to the difficulty in distinguishing prehistoric strata and internal structure within the features, which is a problem that has been noted several times before (e.g., Peter 1982; Howard 1991). This problem is compounded by the limited excavations employed here to determine NRHP eligibility; it is difficult to discern broader structure with backhoe trenches and isolated test pits, and subsequent excavations designed primarily to shed light on form, function, and context should employ methods better suited to that goal (c.f. Howard 1991).

9.2 CHRONOMETRIC AND INTEGRITY ANALYSES USING LAND SNAILS

James T. Abbott, G. Lain Ellis, and Glen A. Goodfriend

One of the research topics addressed in Mariah's previous report (Trierweiler 1994) and continued during testing phase investigations involved the utility of amino acid epimerization of land snails of the genus *Rabdotus* (formerly *Bulimulus*) to questions of site chronology and site integrity. The physical basis of the method has been discussed in detail in a previous report (Ellis and Goodfriend 1994) and will be only briefly summarized here. Rather, this section focuses on the results obtained during the testing phase, highlights some of the remaining ambiguities in the method, and evaluates the potential of the method for chronometric assessment, integrity assessment, and paleoenvironmental analysis.

9.2.1 Physical Basis of the Method

Amino acid epimerization analysis involves the measurement of the ratio of the amino acid epimers D-alloisoleucine and L-isoleucine, referred to hereafter as the A/I ratio, in the organic matrix of the shell. In modern specimens, essentially all of these amino acids are in the L-form, but over time they chemically convert (epimerize) to the D-form. The rate of conversion is a function of temperature, but is consistent enough that the A/I ratio can be used as a proxy measure of relative age, and can provide an approximation of absolute age when tied to a independently-derived chronometric scale (Goodfriend 1987; 1991; Ellis and Goodfriend 1994).

Although some moisture must be present for the racemization reaction to occur, the most important variable involved is heat, which governs the rate of conversion. However, the character of the heat has a strong influence on the effect on the A/I ratio. Goodfriend (unpublished data) has conducted an experiment where boiling of shells over a several hour period had no noticeable effect on the ratio. Thus, moderately high heat (100°C) over relatively short spans of time (hours) appears to have little effect. However, slightly elevated temperatures over considerably longer spans of time, such as occur when a shell is exposed to sunlight for long periods, do appear to influence the rate of the reaction. Thus, a shell which is exposed in sunlight for several years prior to burial is likely to have an A/I ratio that is greater than a shell of equivalent age that was rapidly buried. Conversely, shells subjected to substantially elevated temperatures (e.g., in a fire) for short periods of time appear to rapidly epimerize during heating, resulting in ratios that resemble substantially older (i.e., up to tens of thousands of years) specimens. Depth of burial should also have an effect on the rate of racemization, as daily and annual variations in soil temperature decrease with depth. However, the only investigation to this

point (Goodfriend 1987) failed to establish such a relationship.

Another factor that may affect the relationship between amino acid ratio and age is slope-aspect. One of the implicit assumptions of the racemization method is that the rate of reaction is equal in the spatial realm within the boundary of the study area. In other words, while the rate of the reaction is recognized to vary temporally due to changes in climate, it is assumed to be equal at all locations within the Fort Hood boundary at a given point in time. However, if prolonged exposure to sunlight truly does tend to accelerate the racemization rate by moderately elevating shell temperatures over relatively long spans of time, it follows that shells in areas that receive sunlight for most of the day (e.g., open, south facing slopes) should racemize more rapidly than shells in areas where sunlight is limited (e.g., narrow, north-facing valleys).

The presence of groundwater may also affect the rate and character of the racemization process. At best, shells contained in sediment which is periodically saturated with groundwater emerging from the limestone will experience chilling that should slow the rate of the reaction relative to other shells of similar age in unsaturated sediments. Moreover, there is a strong possibility that leaching and other chemical reactions occurring while the sediment is saturated may substantially alter the basic amino acid composition of the shell, invalidating the measured ratio.

Finally, there is relatively little understanding about the effect of open fires on the shells. It is possible that the amino acid ratio of various parts of a heated shell may differ, because the side of the shell turned toward the heat source experienced a different thermal regime than the part of the shell turned away from it. Thus, a single measurement from a specific point on a shell may not be representative of the shell as a whole. If this is true, it implies that at least some heated shells could potentially be identified on the basis of multiple measurements.

Replicative experiments suggest that the reproduceability of amino acid racemization measures is within approximately ± 5% of the measured ratio. This measurement error is the only error factor computed in the current analysis; while there are many additional potential sources of error (see above), these latter errors are not quantified and are only used during the process of interpretation to explain deviations from expectations. Note that the principal effect of the measurement error is a net loss of precision with increasing shell age. Thus, while relatively recent shells can be estimated with a high degree of precision because the A/I ratio is small, older shells have a considerably larger ratio that includes a wider potential error.

A final factor that must be mentioned is the calibration of the measured values against a laboratory standard, which was revised by Goodfriend between the publishing of the previous report (Ellis and Goodfriend 1994) and this study. The new standard used for the samples reported here is 0.30. To allow for comparability and age prediction, all of the samples calibrated against the old standard (which included many of the specimens used to establish the age-regression) were corrected to reflect the new standard in this study. Therefore, although the numeric values used in this study differ from the values previously published in Ellis and Goodfriend (1994), the underlying data reflects the same relationships.

Despite the potential problems outlined above, promising results have been obtained from the amino acid epimerization program at Fort Hood during the previous burned rock mound investigations (Ellis and Goodfriend 1994; Quigg and Ellis 1994) and during the current investigation. Although some ambiguities remain, A/I analysis clearly has potential to provide a variety of data relevant to archeological questions on Fort Hood and elsewhere in Central Texas.

9.2.2 Considerations of Age Estimation Based on Amino Acid Ratios

One of the principal reasons for development of the amino acid epimerization method is to allow for an alternative method of age estimation to compliment radiocarbon dating (Ellis and Goodfriend 1994). Estimation of the approximate age of snail shells, and hence the deposits that contain them, requires calibration of the epimerization ratio to an independent chronometric scale. The best method for calibration to Holocene time scales is radiocarbon dating. Because the A/I rate is variable among different species, and dependent on the past trajectory of climatic conditions, a curve was initially constructed from ten specimens of a single species (*Rabdotus dealbatus*) collected from a burned rock mound on 41BL598. Each of these snails was radiocarbon dated by the AMS method. The resulting data showed a strong linear correlation between amino acid ratio and radiocarbon age (r^2 = 0.844), indicating that there is a basis for estimation of radiocarbon-equivalent age from a measured ratio of amino acids (Ellis and Goodfriend 1994).

In order to better define the calibration curve, an additional six shells were selected for AMS dating from the suite of samples collected during the testing phase. The shells dated were chosen to fill in temporal gaps in the data used to calculate the regression presented by Ellis and Goodfriend (1994), and were only taken from clusters of epimerization values that were believed to represent the best approximation of the time of deposition at each specific provenience. An initial linear regression was then calculated from the 16 data points (Figure 9.4A). The overall r^2 of the revised group was reduced to 0.78. However, examination of the scatter revealed that while most of the points are relatively well described by the regression line, a few are extreme outliers. Thus, overall variability could be sharply reduced by the elimination of only a few data points.

If the slope of the regression line is assumed to represent the mean rate of racemization through the Holocene, some variability is expected because the rate should change with climate-driven shifts in ambient temperature. However, extreme outliers appear to represent different phenomena. If a shell exhibits an anamolously high A/I ratio in comparison to the mean described by the regression line (e.g., falls well below the line on the plot), the most likely explanation is that the anomalous value is due to low-level heating. If, instead, the point indicates an anomalously low A/I value (e.g., falls well above the regression line), two different explanations are possible: (1) either the shell has been subjected to a prolonged exposure to lower temperature conditions that slowed the rate of racemization, or (2) the radiocarbon age on the shell is anomalously old. In this case, the latter explanation is favored. Because Fort Hood lies in a limestone terrain, there is abundant dead carbonate available in the system. Goodfriend and Stipp (1983) have demonstrated that snails from limestone areas tend to ingest a certain amount of dead carbonate and incorporate it into their shells, resulting in an age anomaly of up to approximately 3,000 years. Thus, radiocarbon ages on snail shell may not reflect the true age of the shell.

In order to test for the presence of an age anomaly, two pre-bomb specimens of *Rabdotus* that had been collected live in Central Texas were obtained from the Smithsonian Institution by Goodfriend and dated by the AMS method. These two specimens yielded apparent ages of 640 ± 50 BP (Beta-78130) and 690 ± 60 BP (Beta-78131), respectively. These results clearly indicate that an age anomaly can exist. However, although the values obtained from the two specimens are fairly close, the data is insufficient to gauge the degree of variability in the age anomaly, which is likely to be strongly affected by the microenvironment that a given snail inhabits.

To minimize the potential error, the two most extreme outliers were eliminated, and the regression recalculated (Figure 9.4B). This improved the correlation dramatically to an r^2 of 0.916, and was the basis for the regression

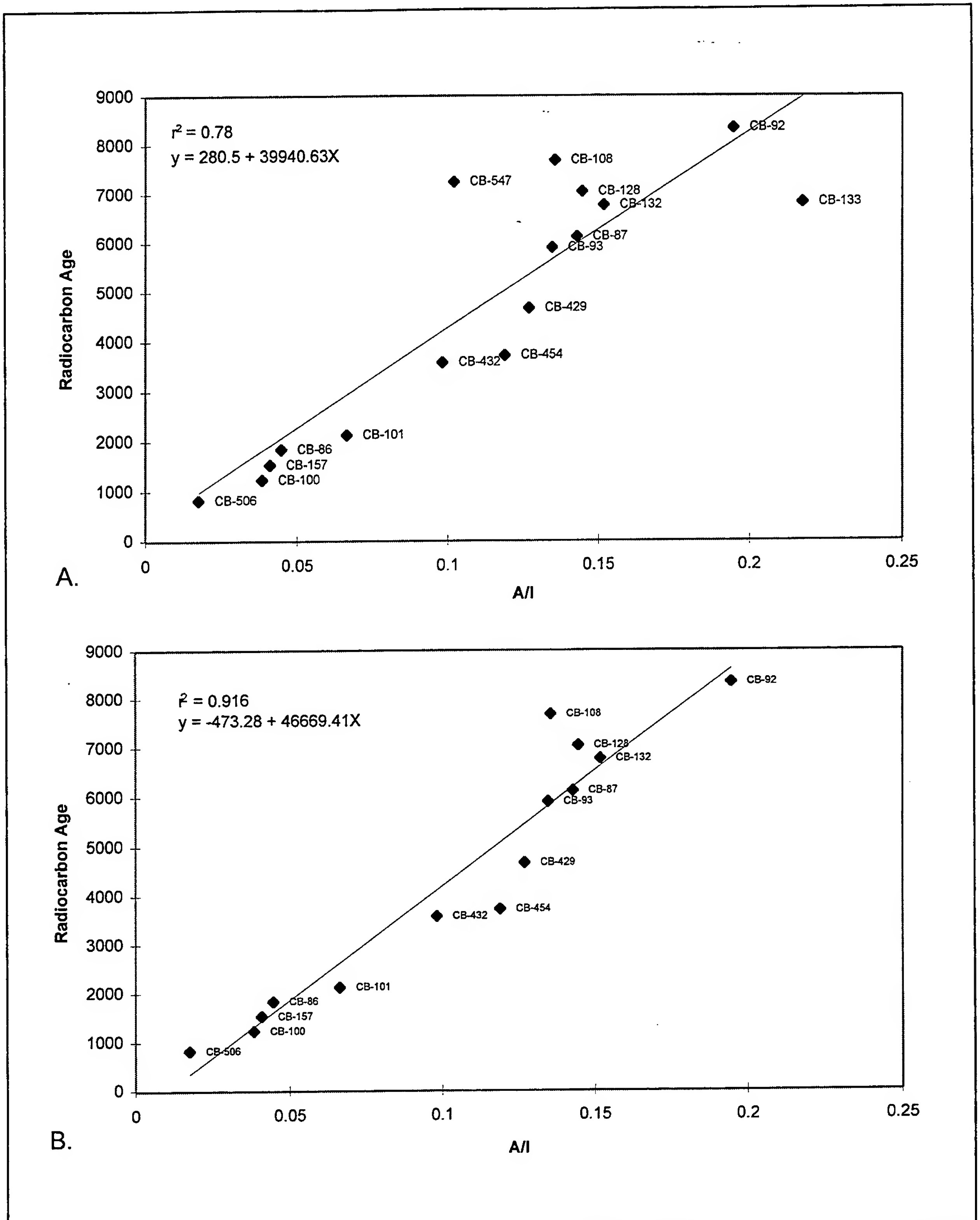

Figure 9.4 Regression of Racemization Values Against AMS Radiocarbon Ages of all Samples (A) and After Elimination of Extreme Outliers (B).

equation used to calculate approximate radiocarbon-equivalent age of the unknown samples in this study. Note that one example of each error was eliminated; one sample was excluded on the basis of probable low-level heating (CB-133) and another was eliminated due to a probable extreme radiocarbon age anomaly (CB-547). While several other shells may also represent heating (e.g., CB-432 and CB-454) or a significant age anomaly (e.g., CB-108 and CB-128), and would improve the correlation further if eliminated from consideration (to r^2 = 0.98), exclusion was limited to the two most extreme examples to avoid possible exclusion of valid data. Likewise, neither of the two modern dated snail shells were used in the regression calculation because (1) neither is from Fort Hood (although both are from the general Central Texas area) and (2) direct amino acid assays from the two shells were not performed (although they could be assumed to be approximately 0.12; see below).

Although there are several alternative ways to interpret racemization data relative to specimens of known age and known racemization value, the most basic method, simple linear regression, was used to calculate the approximate ages listed in Chapters 5.0 and 6.0. In other words, given a suite of radiocarbon-dated snails with known A/I values and radiocarbon ages, a regression equation was calculated such that the radiocarbon-equivalent age could be estimated from the A/I ratio by inserting the value. The general form of the regression equation is:

$$Y = a = bX$$

where Y (the dependent variable) represents the radiocarbon-equivalent age, X (the independent variable) represents the A/I ratio, *a* is the intercept, and *b* is the slope of the line. The values used in the equation are illustrated in Figure 9.4B.

One implication of the slope and intercept of the regression line concerns the magnitude of the average age anomaly associated with the snail shells. If the shell suite as a whole were affected by a significant age anomaly, the Y-intercept should exhibit a positive value roughly equivalent to the average age anomaly. In other words, if the amino acid ratio increases linearly from a value of zero at time zero, and the fit of the regression line is good, the predicted age at an amino acid ratio of 0 (e.g., all L-form isoleucine) should be approximately 0 BP unless the radiocarbon ages used to construct the line are anomalously old due to incorporation of dead carbonate. If the latter is the case, and shells of different ages exhibit radiocarbon age anomalies of similar magnitude, the intercept of the line should approximate the average age anomaly inherent in the shells.

The situation is further complicated by the fact that, as a result of the analytical technique employed, the measured amino acid ratio does not increase from zero. In nature, essentially all of the amino acids in a living shell are in the L-form. However, the act of physically processing the shell to determine the amino acid ratio involves procedures (e.g., digestion in HCl, heating in an oven) that initiate the conversion to the D-form. This phenomenon has been demonstrated to yield a reproducible A/I ratio of approximately 0.12 in modern shells using the laboratory procedures employed in this study. Therefore, it follows that fossil snail shells processed by the same technique should show the same amount of deviation from their actual pre-processing ratio, and 0.12 should be approximately the lowest A/I value that could be obtained. In other words, as a result of a consistent bias imposed on the measurement, the regression line should be artificially shifted to the right, which has the effect of decreasing the Y-intercept. If 0.12 (the approximate minimum measured A/I value) is inserted into the regression equation, the projected radiocarbon-equivalent age obtained is approximately 85 years BP. Even though there should be some L-form to D-form conversion in the 45 years since radiocarbon time-zero (1950 A.D.), this implies that the average age anomaly in the fossil snails is possibly quite small.

However, the data also suggest that the variability in age anomaly is rather large. One of the

excluded specimens (CB-547) exhibits a deviation of approximately 3,000 years, which can only be explained by a considerable age anomaly, a drastically slower racemization rate, or an analytical error. Although they were retained in the analysis, several other specimens (e.g., CB-108, CB-128) also exhibit deviations that probably represent larger than average age anomalies (see Figure 9.4). Because these two specimens have epimerization and radiocarbon values greater than the mean of the dated sample, they serve to increase the overall slope of the regression line and thus decrease the Y-intercept. If these two specimens are also eliminated, the slope of the regression line is decreased and the Y-intercept increased, such that the apparent age anomaly increases from 85 to 135 years. Therefore, although a large average age anomaly is not indicated, the data suggest that the local microhabitat probably exerts strong control on the ingestion of dead carbonate by *Rabdotus*.

The regression curve was used to calculate approximate radiocarbon-equivalent ages for the remainder of specimens analyzed. A total of 228 snails from 29 different prehistoric provienances were assayed during the current study (Figure 9.5). In addition, one snail (CB-547) used in the regression calculation was assayed twice (CB-796) to eliminate A/I measurement error as an explanation for its strong deviation from the other samples, and a living specimen from Fort Hood was assayed to confirm that it exhibited the same magnitude of an initial, laboratory-induced error as noted previously (it did). The measured values from prehistoric specimens ranged from a low of 0.14 to a high of 1.13, which regress to approximate radiocarbon-equivalent ages between 180 and 51,470 BP (see Appendix D). Somewhat surprisingly, the results from the individual proveniences typically showed a moderate to relatively extreme spread of values (see Appendix D). As a result, interpretation of the data to yield an estimate of age required a process of accepting or rejecting individual assays from a given provenience, then averaging the accepted values. Note that the accuracy of the assay itself was not in question, only the likelihood that the obtained value reflected the age of deposition. To accomplish this, the obtained values from each individual provenience were ranked in order of increasing value, and clusters of similar shells were identified visually. Typically, the cluster with the lowest values was assumed to represent the age of deposition, but this was tempered by geomorphic considerations and other contextual data.

Note that the visual technique employed here is different than the statistical clustering technique adapted from Ward and Wilson (1978) used in the previous study (Ellis and Goodfriend 1994). The latter technique was abandoned to allow for context-sensitive judgements of clustering. Ellis' approach assumes that deviation from statistical identity (per Ward and Wilson's Case One procedure) indicates that a mechanism of deviation must be identified to explain absence of clustering. In some cases, deviation would be explained by invoking artificial error-inducting processes such as sunlight or fire, while in other cases it would be explained by invoking assemblage-mixing processes such as redeposition or sediment mixing. In all cases, because the likelihood of obtaining an anomalously high (old) ratio as a result of either reworking of old shells or heating of shells is considerably greater than the likelihood of obtaining an anomalously low (young) ratio through intrusion, particularly in deep, rapid depositional contexts or in colluvial situations, equifinality problems justify going to a less rigorous visual approach. Thus, the spread of values considered as a cluster varied depending on the depositional context (see Appendix D). In all cases, the youngest age cluster was accepted unless there was good reason to reject it (e.g., a basic conflict with geomorphic evidence, anomalous amino-acid composition, or a good cluster of ages with one or two anomalously young outliers).

Note that because a large average age anomaly was not suggested by the regression intercept, the 600-odd year age anomaly apparent in the two modern snails was disregarded in the apparent radiocarbon-age calculations used in Chapters 5.0 and 6.0.

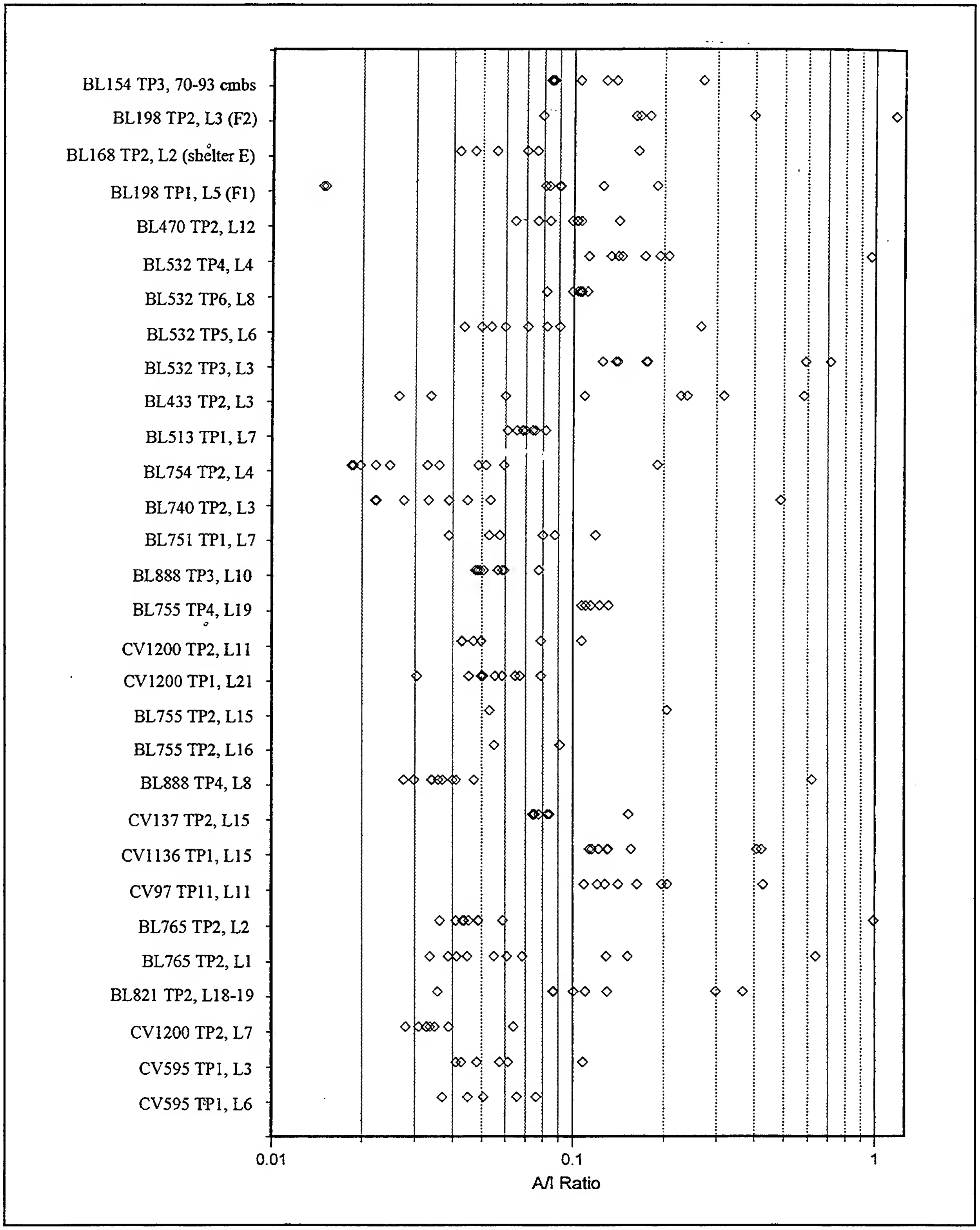

Figure 9.5 Plot of Racemization Results from Each Investigated Provenience Illustrating the Typical Spread of Values.

However, if an average age anomaly of approximately 650 years is assumed, the net effect on the regression line is a decrease of the intercept with no accompanying change in the slope. Thus, correction for this age anomaly, if it assumed to be accurate, is a simple matter of subtracting 650 years from the projected age. For comparison, Appendix D lists the interpreted age from each addressed provenience with no age anomaly correction, and again with a 650 year age anomaly correction.

Overall, the results obtained with the snail dating program (excluding the 650 year age anomaly) agree moderately well with both the chronometric ages and qualitative estimates of age based on stratigraphic context. However, there are still a number of caveats that must be emphasized. First, while the linear regression provides a good first approximation of age, the rate of racemization almost certainly varied through the Holocene as a function of climatic fluctuations, and precision could therefore be improved by adding enough additional data points to the calibration curve to confidently establish a polynomial regression. Second, the effect of slope and aspect needs to be evaluated further; it is entirely possible that precision could be improved by constructing separate curves for north-facing and south-facing topographic situations. Finally, the results clearly indicate that a relatively large sample is required from each provenience to minimize errors resulting from heating and stratigraphic reworking of individual specimens.

9.2.3 Considerations of Integrity Estimations Based on A/I Ratios

Another type of information potentially obtainable from A/I data involves inferences on the integrity of an archeological assemblage based on the apparent integrity of an associated snail assemblage. Because snail shells are subject to the same suite of post-depositional processes that affect artifacts of the same general size and weight, a lack of integrity in a snail shell assemblage is apt to reflect a lack of integrity in an associated artifact assemblage. The potential of the assemblage from isolated levels to be an indicator of archeological integrity has been explored previously (Ellis and Goodfriend 1994; Ellis et al. 1994), and can provide a powerful tool for interpretation. However, a serious impediment to this type of analysis is imposed by the equifinality of anomalous assemblages resulting from reworking and subsequent redeposition of old shells and anomalous assemblages resulting from differential heating of shells, particularly if the heating is relatively mild and results in only a moderate increase in the A/I ratio (Ellis et al. 1994).

As the collective A/I data presented in Appendix D illustrates, proveniences that show strong clustering throughout are the exception rather than the rule. Of the 26 proveniences, only seven exhibit a range of A/I values that is smaller than the mean, while 12 exhibit ranges that are at least twice the mean value. All but two of the provenience exhibit a positive skew, indicating that there is a strong tendency for clustering at the lower end of the measured range, while values on the higher end are typically widely scattered. This may imply that either (1) the investigated proveniences are almost all strongly disturbed, with substantial input of significantly older material; (2) the majority of investigated proveniences contain some shells that have been heated to high temperatures, artificially accelerating the epimerization reaction; or (3) some proveniences contain a high proportion of reworked shells, while others contain a high proportion of heated shells. Unfortunately, there is as yet no sound physical basis for determining whether moderately anomalous A/I ratios are the result of reworking or low-level heating. Nevertheless, the characteristic wide spread in the epimerization ratios from individual proveniences suggest that while some disturbance is probably represented, most of the variability is probably due to heating in association with cultural activity.

One of the principal advantages of using *Rabdotus* as an archeological dating method in Central Texas is the apparent affinity of the species for cultural

detritus; in fact, the association between archeological sites and *Rabdotus* (formerly *Bulimulus*) species is so common that the suggestion has been made that they actually represent a food source that was intentionally gathered rather than a scavenger of cultural detritus (Allen and Cheatum 1961; Hester 1971) (this argument is somewhat bolstered by the relatively rare recovery of juveniles from archeological assemblages, although the most common recovery technique [1/4-inch screen] would hardly be expected to recover juveniles even if they were present). If this hypothesis is true, it follows that almost all of observed deviation should be a function of heating because only living snails would have been gathered. If, instead, the shells primarily represent scavengers attracted to cultural detritus, it follows that most heating anomalies would imply either relatively long-term occupation (e.g., weeks or months) or reoccupation of previous localities, because snails would be unlikely to move in quickly enough to a short-term camp to be heated in large numbers. In either case, the noticeably higher density of snail shells in archeological sites than in the surrounding environment (particularly in open air settings, where the difference can frequently be expressed in multiple orders of magnitude), coupled with the nearly ubiquitous presence of anomalously high epimerization ratios in the investigated proveniences, implies strongly that the majority of specimens were probably heated rather than redeposited by chance from older contexts.

Although the equifinality of low-level heating and reworking complicates integrity assessment of individual levels, much of this ambiguity can theoretically be alleviated by assessing snails from a succession of stacked levels (Ellis et al. 1994). Figure 9.6 presents models of theoretical expectations for a suite of measured epimerization values on shells collected from stacked levels in a variety of natural and culturally-influenced situations. Because every individual, relevant paleosurface within a stacked series of deposits represents some definite span of time (however short), snails that were resident on that surface should also represent a range of time. If the paleosurface is not parallel with the sampling unit imposed (e.g., slopes to some degree, but is sampled with arbitrary, flat levels), the tendency to obtain a range of epimerization ratios results should increase to reflect the inclusion of cross-cutting levels. More importantly, because of the analytical uncertainty inherent in the method, snails of identical age should be expected to yield a span of epimerization ratios that cluster about the "true" value even if the sampling surface coincides perfectly with the paleosurface.

If the effects of heating and reworking are disregarded, the longer a surface is exposed, the greater the range of measured A/I values obtained from shells associated with that surface should be. Thus, snails obtained from a stacked series of levels in sediments that resulted from a relatively constant sedimentation rate should exhibit roughly the same spread of values (as quantified by standard deviation), while the average (mean) value should increase fairly consistently with depth (Figure 9.6A). If the deposits represent an increasing rate of sedimentation, both the mean and the standard deviation of epimerization values should increase with depth (Figure 9.6B). If, instead, the deposits represent a decreasing rate of sedimentation, the mean should increase very slowly with depth, while the standard deviation should decrease markedly (Figure 9.6C).

Deviations from these patterns will result from heating by fire, from disturbance, and from substantial incorporation of older shells. As Figure 9.6C illustrates, construction of a fire on a paleosurface should result in widely disparate A/I values in the levels affected, and should exhibit a range of individual values far greater than the levels below. However, unless the level represents a large, heavily-utilized feature, there is still a good chance that some shells will be unaltered by heat and thus provide a good estimate of age. Even if this is not the case, values obtained from the unaltered levels above and below should still provide limiting ages on the deposition of the sediment of interest.

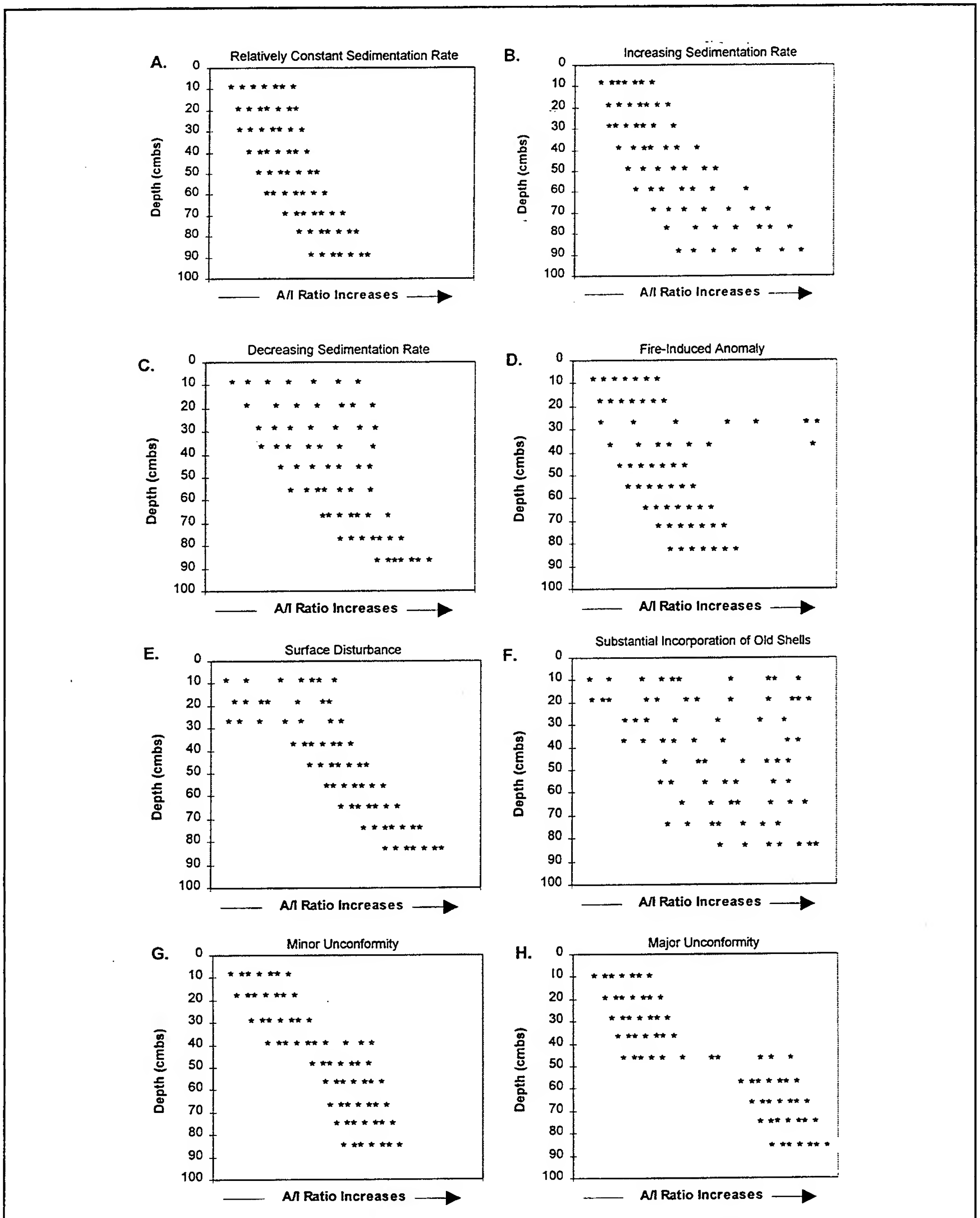

Figure 9.6 Schematic Model of Expectations for Variability in Racemization in a Variety of Depositional and Cultural Scatters.

Disturbance of the upper levels (by vandals or plowing) should be characterized by levels exhibiting roughly equivalent means and standard deviations that represent an average of the affected levels (Figure 9.6E). If the observed spread is due only to disturbance, the mean of the disturbed levels should be no greater than the undisturbed levels below. Examples where the maximum values in the upper zone exceed the underlying context would indicate incorporation of old shells and/or heating.

If old shells are being redeposited in appreciable numbers, the assemblage should resemble the distribution in Figure 9.6F. In this case, standard deviation of the amino acid ratios is irrelevant, but because the assemblage would be expected to contain a mix of contemporary and fossil shells (relative to the time of deposition); however, the minimum A/I value obtained should tend to increase with depth. Note that a similar pattern could be expected in context where a succession of fires was built as the sediment accumulated. For instance, in a rockshelter, where the physical constraints on the placement of a fire coupled with the attraction of such a locality to people typically far outweigh the potential for redeposition of substantially older shells, such a pattern is at least as likely to result from a succession of heating episodes as from reworking of older deposits.

Finally, unconformities in the sediment column should also be apparent. Short-term unconformities (Figure 9.6G) should exhibit a relatively minor, but noticeable shift towards larger epimerization values beneath the unconformity, while major unconformities (Figure 9.6H) should evince an extreme shift commensurate with the length of the depositional hiatus. Note that in both cases, admixture of snails from the two sediment packets at the unconformity is apt to create a level with an anomalously large spread of values at the contact.

Only one instance of stacked proveniences was examined during this phase of work. In this case, two adjacent levels from a test pit in a rockshelter (41BL765, TP 2, Levels 1 and 2) were addressed with ten shells and nine shells, respectively. Although a moderately large number of artifacts were recovered from these two levels, the test pit was situated next to a vandal pit and was judged to be probably disturbed in the initial assessment. However, the mean radiocarbon-equivalent ages of the accepted A/I clusters from Level 1 (four shells; approximately 1280 BP) and level 2 (seven shells; approximately 1470 BP) were both stratigraphically normal and very reasonable estimates. Moreover, while both levels contained one shell that had obviously been strongly heated, the range of variation apparent in the remaining nine shells from Level 1 (standard deviation = 0.040) was much greater than the remaining eight shells in Level 2 (standard deviation = 0.006); in other words, Level 2 exhibited much tighter clustering. This strongly suggests that the two levels are not homogenous, as would be expected if they had been mixed by vandalism. As a result, the initial conclusion that the integrity of the deposits had been totally destroyed by vandalism was rejected, and the site was judged to be eligible for inclusion to the NRHP.

9.2.4 Paleoenvironmental Inferences from A/I Ratios

A final suite of relevant data potentially obtainable from epimerization analysis of radiocarbon dated snail shells concerns paleoenvironmental trends. Because the rate of the epimerization reaction is temperature-dependent, it follows that this rate is a qualitative proxy measure of changes in mean temperature (or, more likely, mean summer temperature) through time. Thus, changes in temperature regime should be evinced by changes in the slope of lines drawn between consecutive A/I pairs of known age (Figure 9.7). However, uncertainties inherent in both the calculation of epimerization ratios and radiocarbon ages preclude placing too much interpretive weight on any two individual radiocarbon-A/I pairs.

In order to minimize errors resulting from individual measurements, a regression line can be

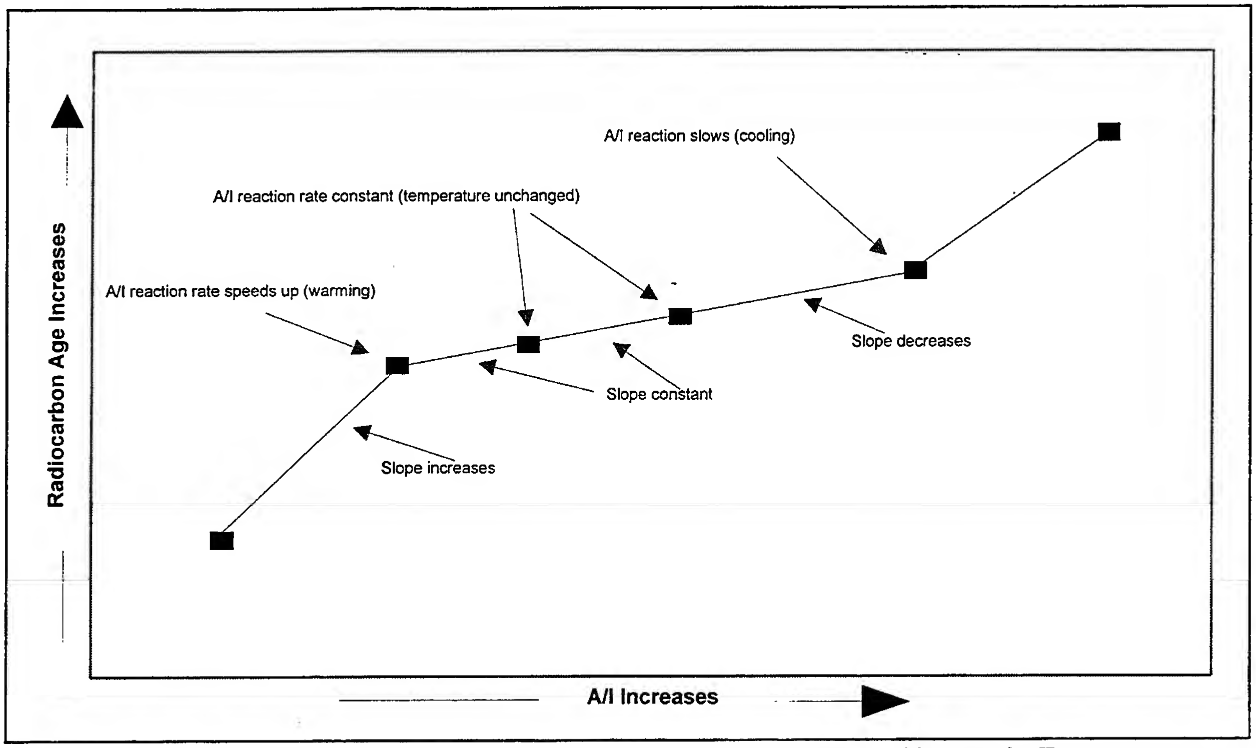

Figure 9.7 Theoretical Response of Racemization Rate to Long-term Changes in Temperature.

fit to temporally-ordered subsets of the data set. To illustrate this process, a preliminary analysis was performed with the extant suite of 16 radiocarbon-A/I pairs. The analysis proceeded as follows: 1) the obvious outliers and temporally-reversed epimerization values (CB-547, CB-108, CB-128, and CB-133) were eliminated from the consideration; 2) eight sets of five consecutive points were constructed by excluding the youngest point and adding the next oldest one in the sequence (e.g., ABCDE, BCDEF, CDEFG, DEFGH, etc.); 3) regression slopes were calculated for each set of five consecutive values; 4) mean radiocarbon age was calculated for each set; and 5) the results were graphed (Figure 9.8). While the results appear to show a cooling trend during the latter middle Holocene, followed by a sustained warming trend during most of the late Holocene, the uneven distribution of the data points affects the reliability of each individual measure differently. Figure 9.9 illustrates the same trend contrasted with the spread of radiocarbon ages contained within the group; as can be seen, the age span ranges from a low of approximately 1,300 years to a high of almost 4,000 years. The greater the age range represented by a given group, the more likely that the regression masks one or more significant internal shifts in the rate of the epimerization reaction, and thus in temperature. Therefore, it can be argued that while the technique exhibits promise, its reliability and explanatory power would be increased significantly by the addition of a number of additional data points.

Another potentially fruitful avenue of investigation involves a combination of the above technique with other analytical methods. Because it also can indicate temperature trends, a comparison of oxygen isotope analyses of the same specimens with the A/I trends could prove very valuable. Because oxygen isotopes are more indicative of the temperature of precipitation, while the A/I trend should better represent air temperature, an analysis integrating these two lines of evidence has the potential to illuminate shifts in the seasonality of

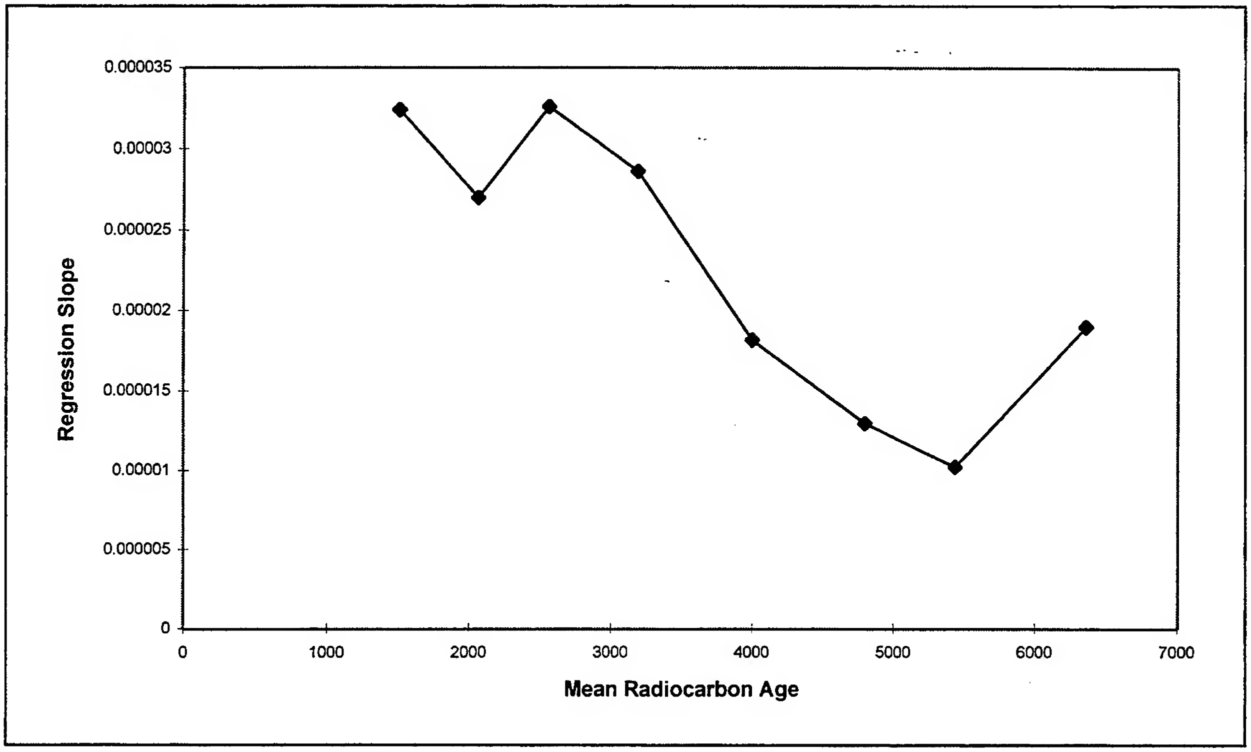

Figure 9.8 Trend in Regression Slope Derived from Dated Snails.

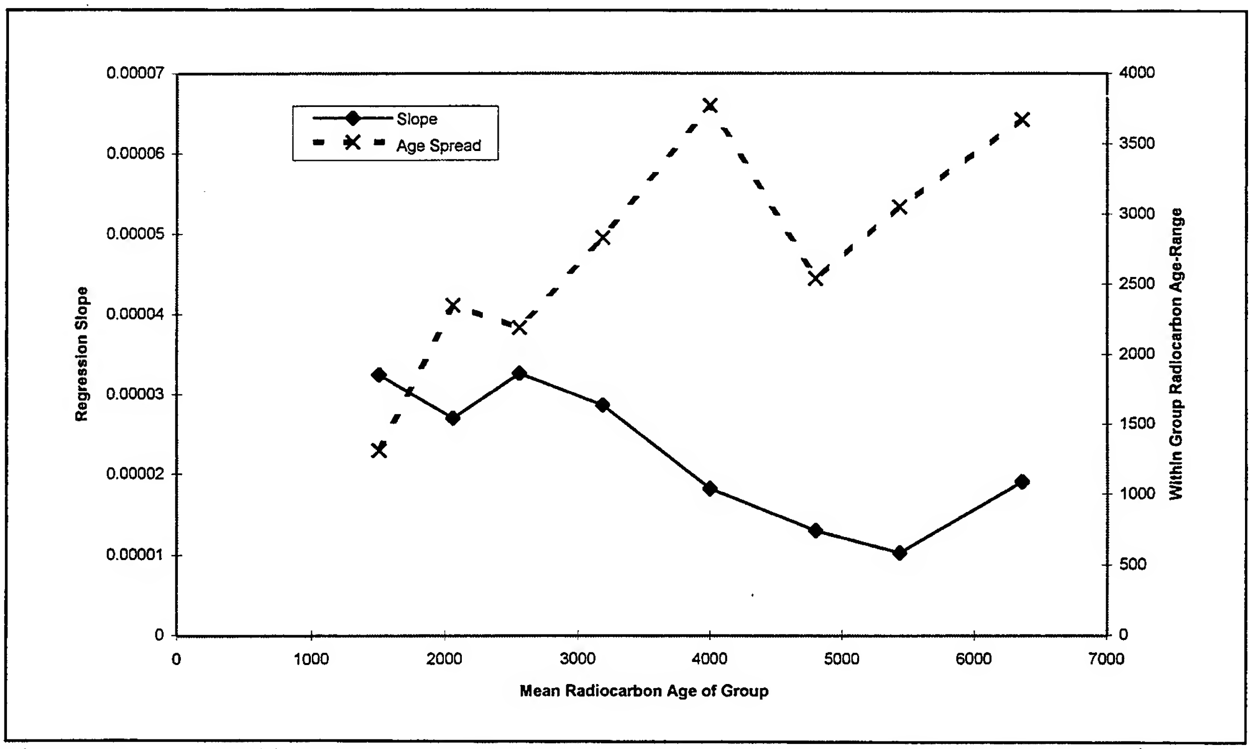

Figure 9.9 Trend in Regression Slope Compared With Age Spread of Shells Used in Each Regression Calculation.

precipitation and/or in the relative importance of Pacific and Gulf moisture sources through the Holocene. Because carbon isotopes incorporated in the shell should reflect the isotopic composition of a snail's diet, pursuit of this line of evidence could potentially result in a mechanism to examine the relationship between the climatic parameters outlined above and the C3/C4 composition of the resulting vegetative community. Granted, much more work needs to be done before the utility of the above techniques can be established, but the potential benefits make such efforts well worth pursuing.

9.3 OBSERVATIONS ON PALUXY SAND SITES

James T. Abbott

One of the most interesting trends detected during the evaluation of 571 sites conducted previously by Mariah (Trierweiler 1994) is the rather unique character of sites situated on the outcrop of the Paluxy Sandstone substrate in Coryell County. This discussion summarizes the previous observations (Abbott 1994), addresses information obtained from Paluxy Sand sites during the testing phase, and discusses the implications of this additional information.

9.3.1 Landscape Context of the Paluxy Sites

The Paluxy Formation consists of fine to very fine friable sandstone cut with thin beds of mudstone and limestone (Barnes 1972a; 1972b; 1976). Although widespread in north-central Texas, where it achieves thicknesses of more than 30 m and forms the principal substrate underlying the Western Cross Timbers, the formation thins markedly to the south and finally feathers out in the vicinity of Fort Hood. In fact, the formation is not formally mapped within the reservation boundaries (cf. Barnes 1970). Nevertheless, the Paluxy Formation does occur on Fort Hood, although it appears limited to the western side of the base in Coryell County.

As outlined in Chapter 2.0, Fort Hood is underlain by early Cretaceous marine carbonates that dip gently to the east. The Paluxy is the uppermost member of the Trinity Group, which also includes the Glen Rose limestone. It is overlain by rocks of the Fredericksburg Group, including the Walnut Clay, Comanche Peak Limestone, and Edwards Limestone. The formation crops out around the upper margin of the incised valleys of Cowhouse Creek and its tributaries below the intermediate upland (Killeen) surface. Fort Hood is at the extreme southeastern edge of the Paluxy outcrop. Although no formal investigation of the distribution of Paluxy has been undertaken, incidental field experience suggests that the thickness of the unit fluctuates considerably on base (up to a maximum thickness of 3 to 4 m), and it is entirely absent in places. As a result, it does not occur as a continuous band around the margin of the incised valleys, but rather is patchy and relatively unpredictable. Where the Paluxy does occur, it is usually strikingly obvious because it supports an ancient, highly reddened soil that is entirely different than the soils developed on the surrounding limestones and marls.

Because the unit has not been mapped, its distribution is difficult to summarize. Figure 9.10 which combines Paluxy substrates noted by Mariah personnel during the earlier work phase (Trierweiler 1994) with the mapped distribution of soils characteristic of the unit (McCaleb 1985), provides the best approximation of its distribution on the base currently available. Note that while this distribution is only an approximation and probably underestimates the extent, it is probably safe to say that the unit outcrop does not exceed 2% to 3% of the total area of the base.

Soils formed in the environment are typically heavily weathered and very red, and contrast markedly with adjacent calcareous soils. Two USDA soil series are typical of the Paluxy. Cisco soils are Alfisols that exhibit a strong argillic horizon, and are typical of more stable parts of the outcrop. Wise soils, in contrast, are relatively weakly developed Inceptisols typical of more

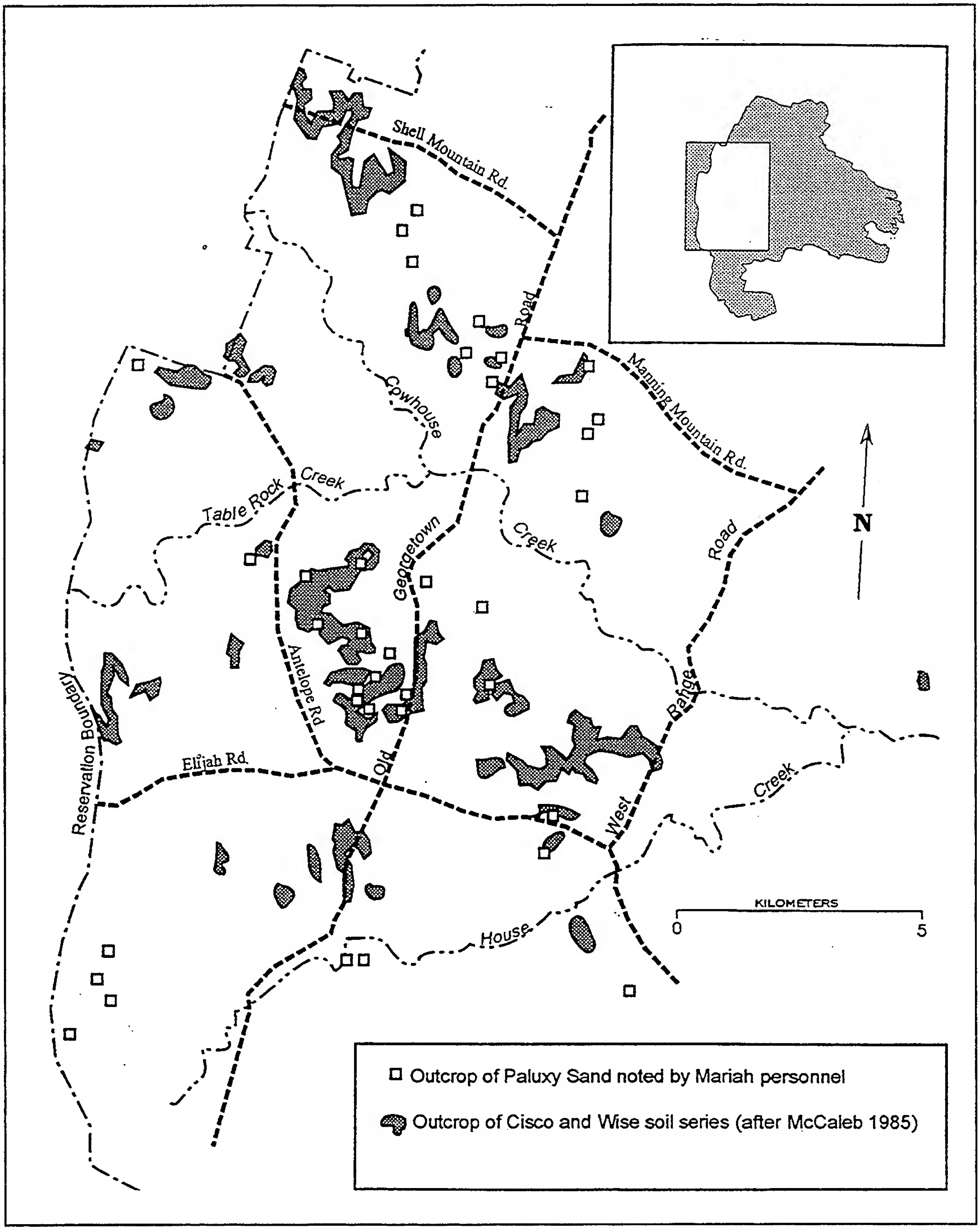

Figure 9.10 Approximate Distribution of the Paluxy Sand on Fort Hoods, Based on the Distribution of Characteristic Soils and Localities Noted by Mariah Personnel.

active erosional and depositional areas, including some broad, sandy aprons downslope of the actual outcrop. The schematic profile presented in Figure 9.11 illustrates an idealized sequence, with the upper A-C profile roughly corresponding to the Wise series and the well-developed A-Bt-Bw-BC-C profile corresponding to the Cisco series. A common variant the lower soil is calcareous, resulting in an A-Bt-Bk profile.

Typically, the entire profile is not preserved across the span of the outcrop. Rather, a distinct erosional catena is typical. Upslope, the surface tends to be highly eroded and soil development is negligible. However, downslope the argillic horizon becomes thicker and better preserved, and relatively thin sheets of overlying slopewash/colluvial sands become increasingly prevalent. In some cases, a dark brown loamy sand that represents the original A horizon is preserved near the base of the outcrop. This horizon is almost always mantled with sheet sands derived from upslope. Continuing downslope past the Paluxy outcrop onto the upper Glen Rose, colluvial sheet sands up to 0.5 m thick represent an additional associated locus of deposition (see Figure 9.11).

9.3.2 Summary of Previous Archeological Information

Sites in the Paluxy environment typically consist of collections of burned rock features that are always either situated on the erosional older soil or contained within the colluvial and sheetwash sands that mantle the lower part of the outcrop and the Glen Rose formation downslope. These features range from small burned rock concentrations less than 1 m in diameter to low burned rock mounds 10 m or more in diameter. A total of 23 sites either partially or totally underlain by the Paluxy substrate were examined during the course of the previous investigations (Trierweiler 1994). This represents slightly more than 6% of the total upland sample. If upland areas used as lithic resource procurement localities (which typically occupy the top and flanks of the higher Manning surface) and upland sites in Bell County (where exposures of the Paluxy do not exist) are excluded, Paluxy sites account for approximately 11% of the total upland sample. Although the full extent of Paluxy outcrop is unknown, the available data suggests that it probably doesn't exceed 4% to 5% of the total area of the portion of base that lies within Coryell County. Therefore, it can be argued on the basis of site frequency alone that the Paluxy substrate was preferentially selected by the prehistoric inhabitants.

However, there is a stronger argument for intentional selection than these percentages provide. The one unifying characteristic that all Paluxy sites share is the presence of burned limestone features in an area where limestone was not immediately available, and therefore had to have been transported in distances ranging from a few meters to up to 100 m. This fact, more than any statistical information, demonstrates that the Paluxy substrate was intentionally selected as a locus of activity, because it is the only explanation for the physical labor required to transport considerable volumes of rock to the sites.

Another characteristic noted during the previous work phase was a characteristic low return of lithic debitage from the burned rock features on the Paluxy sites relative to similar features in other landscape contexts. A total of 51 burned rock features shovel tested from the Paluxy context during the previous work phase yielded an average of 5.1 lithics per shovel test, while the 20 non-paluxy burned rock features yielded an average of 77 flakes per shovel test (Trierweiler 1994;Table 9.23). Coupled with the apparent selection of the substrate, this implies that Paluxy sites may represent a specific activity or suite of activities, rather than generic campsites. Three possible explanations for the selection of the Paluxy substrate were advanced in the previous report (Abbott 1994). These hypotheses were:

(1) The prehistoric inhabitants were exploiting biotic resources unique to or concentrated on the Paluxy soils. What these resources may

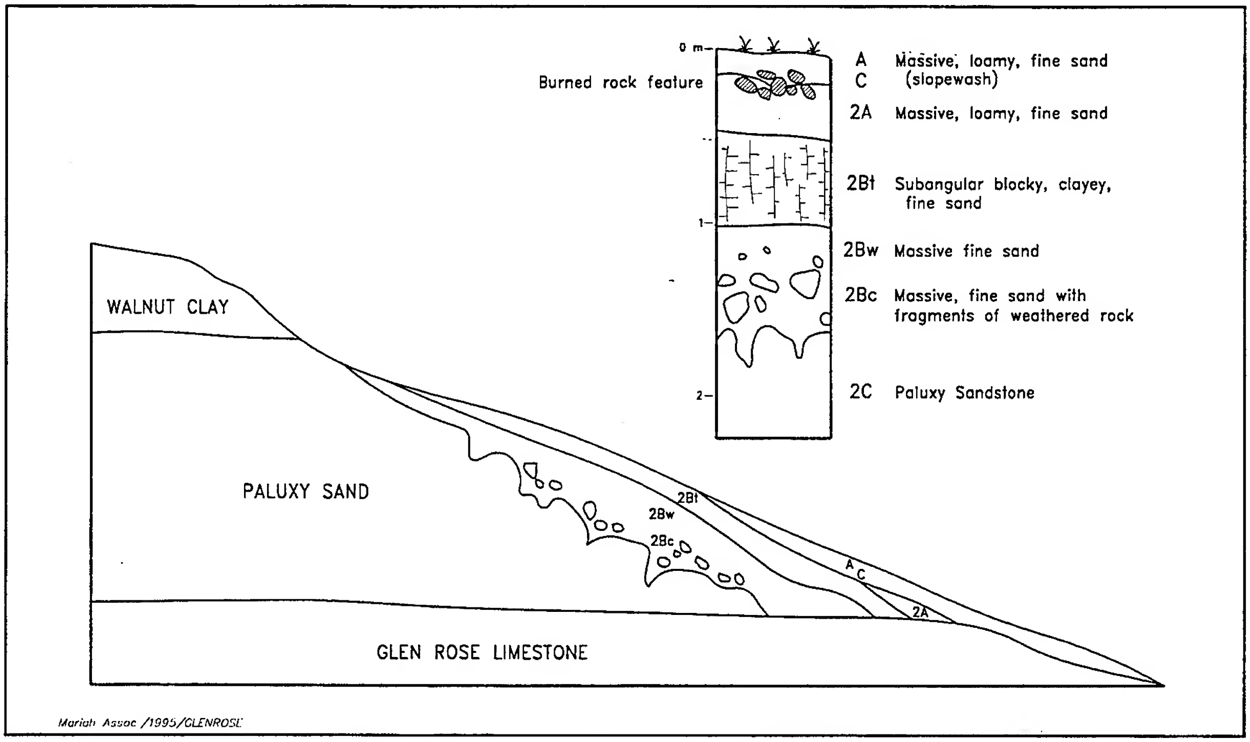

Figure 9.11 Idealized Profile and Schematic Erosional Catena of Paluxy Sand Outcrop.

have been is unclear, but the neutral to acidic Paluxy does support a slightly different assemblage of vegetation than occurs on surrounding calcareous substrates. If this is the case, it follows that the resources would have been sufficiently concentrated to make it more efficient to carry the rock to the resources than the resources to the rock. Another implication is that the occupation may have been targeting food resources with seasonal availability, and thus represent part of a broader seasonal round. It is also conceivable that the resource was fuel rather than a foodstuff, particularly during dry periods when woody vegetation was relatively scarce. In north-central Texas, the modern outcrop of the Paluxy substrate coincides with the eastern part of the Western Cross Timbers), and is typically wooded while surrounding calcareous rocks support grassy vegetation.

(2) The prehistoric inhabitants were locating on the substrate because its sandy texture and rapid drainage made it a more desirable living surface than surrounding soils with stony clay epipedons. This implies that occupation coincided with relatively moist intervals (or times of year) when differences in permeability and drainage would have been significant.

(3) The prehistoric inhabitants were locating on the substrate because its sandy texture made it easy to excavate pits to concentrate heat or because deep extant gullies could be exploited for the same purpose. There is evidence from several sites that pits or central depressions were commonly associated with burned rock features, and excavation into the Paluxy is significantly easier than into the thin clays and limestone of adjacent geologic formations.

9.3.3 Summary of Observations from the Testing Phase

The preceding observations suggest that Paluxy sites are relatively unique cultural assemblages, and the three broad hypotheses advanced in the

preceding report (and reiterated above) represent informal hypotheses that are subject to formalization and testing. However, directed hypothesis testing was inconsistent with the goal of the testing phase (NRHP eligibility determination), and was not pursued directly. Still, the testing phase investigations did yield information of interest, which is summarized below.

Five sites (41CV319, 41CV595, 41CV1023, 41CV1027, and 41CV1391) which were either partially or totally underlain by a Paluxy outcrop or developed in sandy colluvial sediments downslope from an outcrop were examined during the testing phase. Fourteen burned rock features were examined on these sites, including one feature designated as a burned rock mound, six features designated as burned rock middens, five designated as burned rock concentrations, one designated as a rock-filled basin hearth, and one designated as a slab-lined hearth. In general, although most of the investigated features exhibited the same type of relatively low artifact frequency noted previously, considerable variability was apparent. Figure 9.12 illustrates the return of debitage (frequency) and burned rock (kg) from each of the investigated features and from the aggregate non-feature contexts on each site, standardized to reflect return per cubic meter. Plotted on a log-log scale, the figure illustrates that the amount of associated debitage and burned rock varied by better than a order of magnitude between features. More importantly, the non-feature contexts on the sites frequently exhibited similar debitage returns per unit volume. Moreover, this non-feature context frequently represents an average value derived from a number of sterile levels and a few high return levels, and thus underemphasizes the amount of debitage concentrated locally in non-feature contexts. For example, the vast majority of debitage from 41CV1023 (88% of the total) was obtained from two levels in the only one of the seven test units excavated in non-feature context. Considered alone, this concentration of lithics achieves an equivalent density of almost 1,000 items per m^3, which exceeds any of the features from the Paluxy environment (see Figure 9.12) and all but the richest middens in other environments on the fort (Figure 9.13).

In short, the testing data does not support the proposition that the debitage content of Paluxy sites is statistically distinct from other sites on the Fort. While both debitage and burned rock do tend to occur in low frequency relative to many sites in lowland settings, the range of variability in non-Paluxy features more than encompasses the Paluxy features (see Figure 9.13). Examination of the plot reveals three broad, transitional categories in the distribution: a few relatively debitage-rich (i.e., more than 500 lithics/m^3) middens with low to intermediate densities of burned rock (i.e., 100 to 500 kg/m^3); even fewer relatively debitage-poor (i.e., <50 lithics/m^3) mounds with very high densities of burned rock (more than 600 kg/m^3); and a very large number of features (both mounds and middens) with low to moderate lithic and debitage frequencies. The first two categories can be considered end-member "archetypes" of middens and mounds, respectively (see section 9.1), while the large third category represents a transitional area between mounds, middens, and simple occupation zones. As Figure 9.13 illustrates, Paluxy features are essentially indistinguishable from other features within this third and most numerous category on the basis of debitage and burned rock return. Moreover, the occasionally significant debitage return from test pits in non-feature contexts indicates that a focus on features during the reconnaissance phase probably obscured the debitage return of the sites as a whole, because much of the lithic reduction may have occurred in different areas of the sites.

A similar pattern is apparent when the sites are considered as a whole. Figure 9.14 illustrates overall artifact return (lithics, bone, and burned rock) from the eligible sites by broad landscape context, and includes both feature and non-feature levels excavated at each site. Once again, while Paluxy sites tend to be clustered within one portion of the scatter, they are not distinct from the other sites. Lithic return, in particular, is similar to the return of the majority of sites in other contexts.

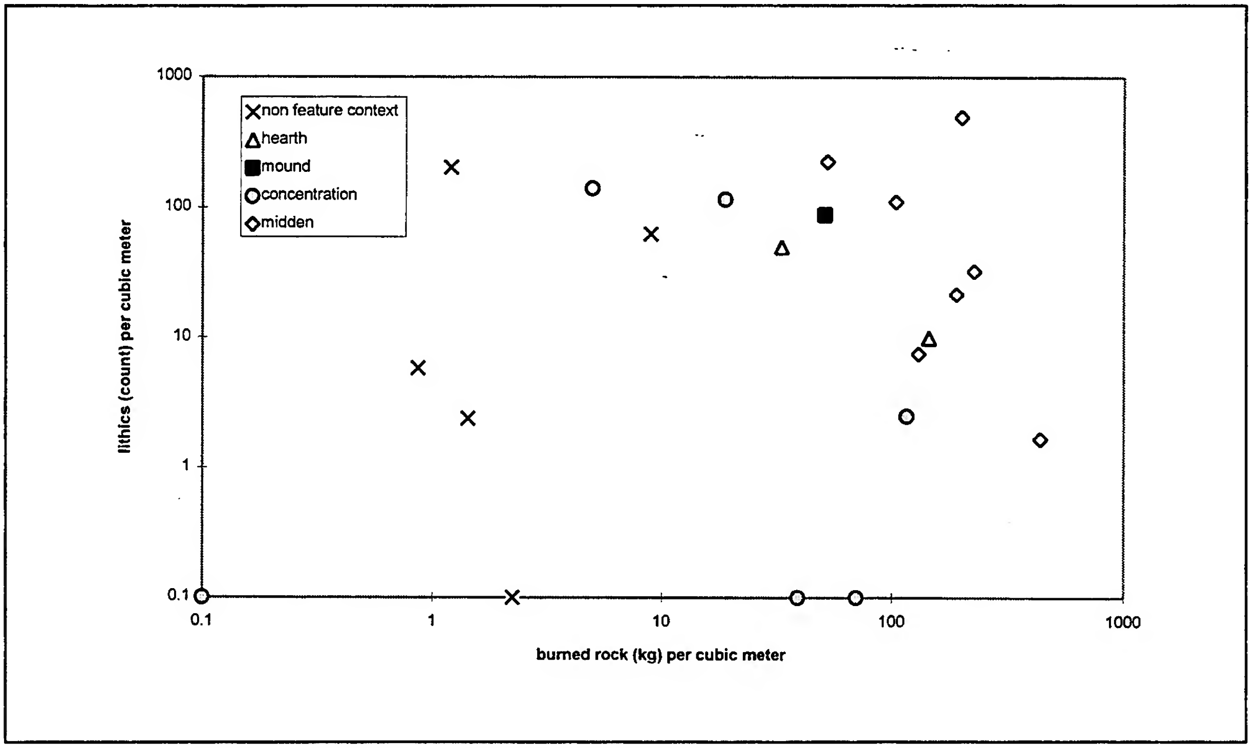

Figure 9.12 Return of Debitage and Burned Rock from Investigated Paluxy Features.

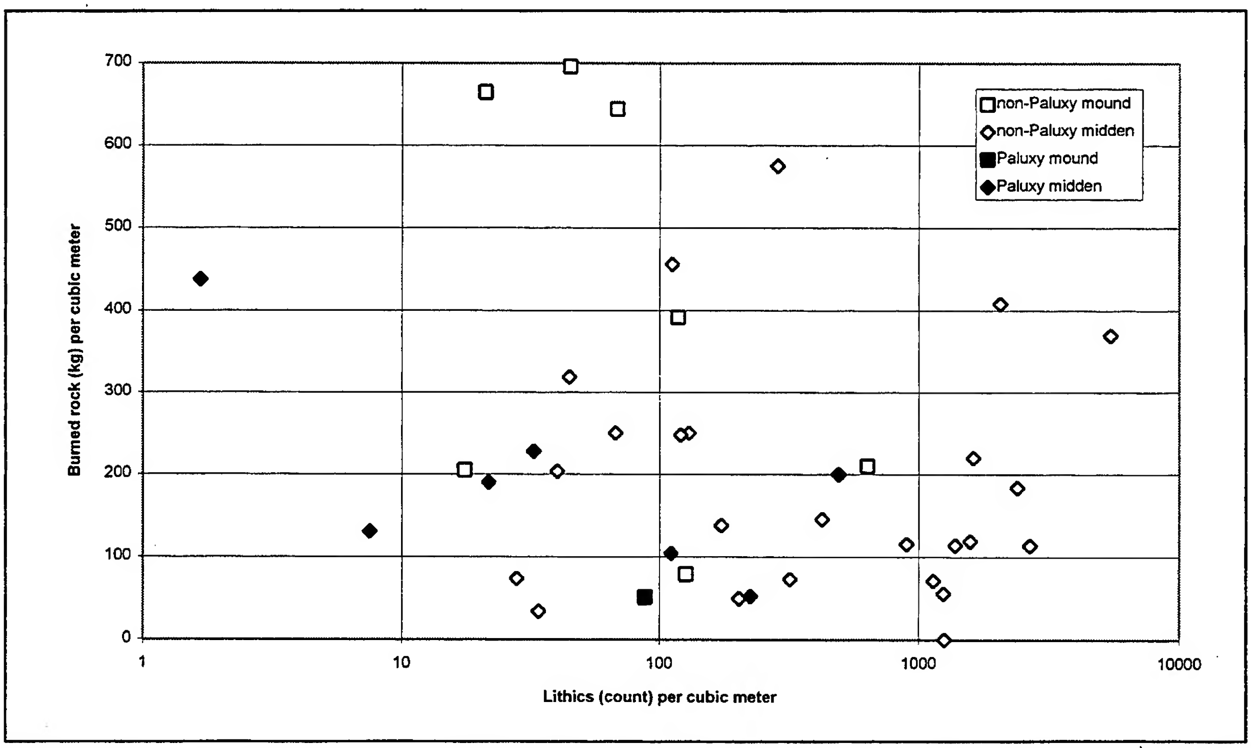

Figure 9.13 Comparison of Burned Rock and Lithic Return from Paluxy and Non-Paluxy Mounds and Middens.

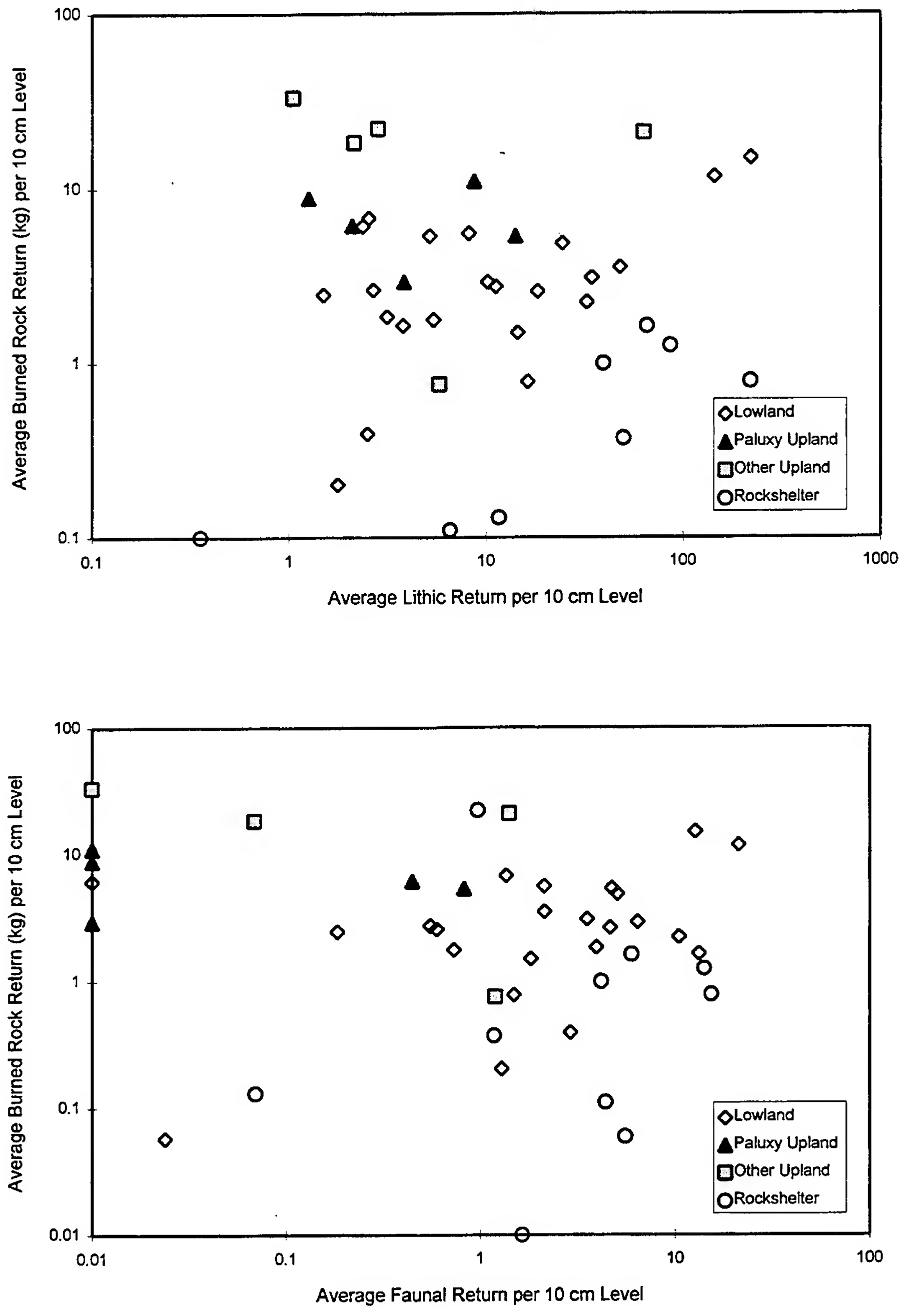

Figure 9.14 Average Lithic and Faunal Return from Eligible Sites.

While the faunal return is relatively more distinctive (one fragment per 10 cm level or less), similar returns were obtained from most of the other upland sites, as well as a few in lowland and shelter contexts. Moreover, it is unclear whether this typical low rate of return of the Paluxy sites is attributable to cultural processes or to postdepositional modification of the assemblage in the relatively acidic edaphic environment.

Another type of relevant information obtained during the testing phase consists of additional chronometric data from the Paluxy features. A total of six radiocarbon ages were obtained from four different midden features on 41CV319 (F 1), 41CV1391 (F 1/1A), and 41CV595 (Fs 1 and 2), which compliment the eight ages obtained previously from Paluxy sites as a part of the burned rock mound study (Quigg and Ellis 1994). Four of these latter ages were obtained from a mound (F 1) on 41CV1027 (which is also addressed in this study) and the other four were obtained from a mound (F 2) on 41CV594 (which is not addressed here). These ages are presented in Figure 9.15. With the exception of one very recent age from F 2 at 41CV594, the dates cluster into two broad time ranges of approximately 4600 to 4000 BP (Middle Archaic) and 1900 to 800 BP (Transitional Archaic-Early Late Prehistoric). Interestingly, the four middens on 41CV319, 41CV1391, and 41CV595 all yielded ages in the younger range, while the two mounds on 41CV594 and 41CV1027 yielded all the older ages (although one additional age in the younger time range was also obtained from the mound on 41CV594, suggesting a reuse episode during the latter time period).

Projectile point recovery from the Paluxy sites also supports these trends, albeit somewhat weakly. Although no radiocarbon ages were obtained from 41CV1023, two Scallorn arrow points, a Marshall dart point, and an untyped dart point were recovered from the site. These points imply that Middle Archaic and early Late Prehistoric (Austin Phase) age occupations are represented at the site, and thus coincide quite well with the two temporal periods suggested by the radiocarbon suite. No projectile points were recovered from 41CV319 during either of Mariah's work phases, but a Scallorn point was collected in 1978 when the site was first identified. At 41CV1027, projectile points recovered included two Yarbrough (general Archaic), two untyped dart, and one untyped arrow, while projectile points from 41CV1391 include a Darl and an untyped arrow. All of these latter points are also broadly consistent with the radiocarbon clusters. Only at 41CV595, where two Late Archaic points (a Castroville and a Montell) were recovered, is there an indication of occupation in the interim between the older and younger age clusters indicated by the radiocarbon dates.

Economic information is sorely lacking. Largely because initial recovery was so poor, only two light-fraction flotation samples from Paluxy sites were submitted for macrobotanical analysis. Both of these samples were from 41CV1391. The only taxa identified in the samples consisted of charred live oak wood, which probably represents prehistoric fuel, and intrusive juniper needles. Faunal material from the sites is equally limited. Mussel shell (subsequently identified as *Amblema* sp.) was recovered from one site (41CV1027), while limited bone (representing at minimum cottontail rabbit and at least one relatively large artiodactyl) was recovered from one site (41CV595).

9.3.4 Discussion

Given the results of testing, it can no longer be argued that Paluxy sites are artifactually distinct from other sites on the base. Granted, they do not exhibit the very intense debitage frequency typical of the largest archetype middens in the lowlands, nor do they contain the very dense burned rock of archetype mounds in the uplands. However, as Figure 9.12 illustrates, these archetype features are probably the exception rather than the rule, and features in the Paluxy environment appear indistinguishable from the majority of burned rock mounds and middens in other landscape contexts

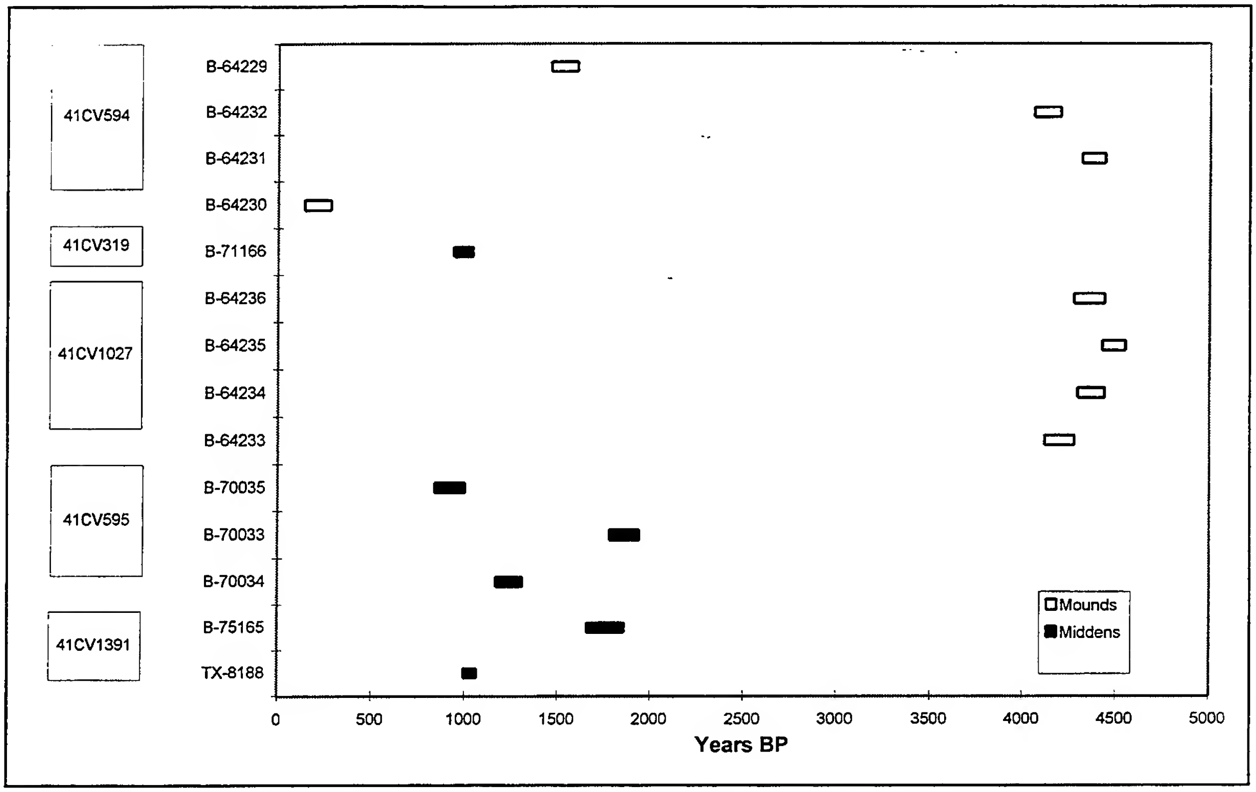

Figure 9.15 Chronometric Data from the Paluxy Features.

on the fort on the basis of burned rock and lithic content. Although other artifact classes (particularly bone and shell) tend to be more rare on Paluxy sites than lowland and shelter contexts, it is possible that unique edaphic factors in the Paluxy environment have resulted in poor preservation; therefore, this criterion cannot be used to argue for uniqueness of the typical Paluxy assemblage.

If the artifact assemblage is not different, as previously proposed, then the question may be asked "does the previous identification of Paluxy sites as a phenomenon of interest collapse?" We believe that the answer is no, because the sites still appear to represent a relatively unique pattern of prehistoric activity. Even though the testing data does not support the previous proposition (Abbott 1994) that the artifact assemblage from Paluxy sites is unique, the proposition that Paluxy sites represent intentional selection of the substrate as a locus for human activity remains unchanged, and merits further attention. Moreover, the data tentatively suggests that most occupations on the Paluxy substrate may fall into two restricted time ranges (roughly equivalent to the San Marcos and Round Rock phases of the Middle Archaic and the Driftwood and Austin phases of the Transitional Archaic and Late Prehistoric) with an extended gap or low-use period during the intervening Late Archaic (e.g., Uvalde and Twin Sisters phases). This suggests that whatever activity or activities were conducted on the sites may have been an important part of Middle Archaic and Transitional Archaic/Late Prehistoric subsistence strategies but relatively unimportant in other periods. Moreover, because the limited extant data suggests that the types of burned rock features employed during the Middle Archaic and Transitional Archaic/Late Prehistoric may have been different, the possibility that two distinct adaptive patterns are represented remains.

Therefore, we maintain that Paluxy sites are still a topic of considerable interest in the prehistoric record of Fort Hood. All five of the Paluxy sites examined during the testing phase proved to possess data content that renders them eligible to the NRHP. However, their role in the prehistoric economy and their relationship to the culture history of the area remains to be resolved. Because all three of the hypotheses advanced previously (Abbott 1994) remain viable, directed data recovery phase investigations concentrating on broad areal investigations focusing on intensive recovery of the limited economic data content are required.

9.4 ROCKSHELTERS

James T. Abbott

Sixteen rockshelters on 14 sites were investigated during testing phase investigations (Table 9.11). Test pits were excavated in 15 of these shelters; the sixteenth (41BL432) lacked significant internal deposits and was tested only for the paleoenvironmental data potential of a tufa mound. Eligibility determinations on each of these sites are presented in the appropriate sections in Chapters 5.0 and 6.0, and are summarized in section 7.1. The following paragraphs present synthetic discussions of the cultural record, geomorphic record, and paleoenvironmental record preserved in the shelters. Note that testing of the shelter at 41CV1008 post-dates this analysis and is not included here. The analysis that follows is based on data recovered from the other 14 tested shelters (see Table 9.11).

9.4.1 Cultural Observations

With the exception of 41BL432, some type of cultural material was recovered from each of the shelters investigated during the testing phase, indicating that all were loci of prehistoric cultural activity. However, the density of recovered cultural material varied considerably, suggesting that while some of the shelters were intensively used and probably represent intermediate- to long-term habitation sites, others were sparsely used and probably represent short-term, expedient shelter from the elements.

Intensively used shelters are typified by a rich, diverse artifact assemblage. Two shelters are particularly noteworthy: 41BL433 and 41CV1011. Collectively, these two shelters account for 66% of the projectile points, tools, and cores, 59% of the debitage, and 47% of the faunal material recovered from all 16 of the investigated shelters (Figure 9.16). This suggests that these two shelters were the site of relatively long-term occupations where a broad range of activities were routinely pursued. Interestingly, 41CV1011 has been vandalized to such an extent that all testing was conducted on the talus slope in front of the shelter itself. This suggests that the talus of many other shelters, which was typically not investigated intensively, may also contain a valuable record of occupation that has been only minimally impacted by vandalism during the modern era. If a shelter is intensively occupied, it is reasonable to assume that considerable quantities of detritus will end up on the talus as a result of activities outside the overhang and periodic cleaning of the shelter interior, possibly preserving a better record of the subsistence and technological systems than is preserved inside the shelter. Despite this fact, the pro-shelter talus is never the focus of looting activity, and many heavily damaged shelters are associated with relatively pristine talus slopes. Thus, even shelters that have been almost totally destroyed by intense vandalism might still have considerable data potential if the scope of investigation is broadened to include the talus slope.

In addition to the two shelters with very rich assemblages, several other shelters (e.g., 41BL754, 41BL567, and 41BL886, and 41BL168) preserve a broadly similar pattern of artifacts, suggesting an equally diverse suite of activities, but have a lower rate of return indicative of a shorter period of occupation. In general, these shelters exhibit a higher tool to debitage ratio than exhibited by the intensely occupied shelters, suggesting that many

Table 9.11 Tested Shelters.

Site	Subdivision	Dimensions	Test Units	Maximum Depth	Sediment Types[a]	Notes
41BL168	Shelter C	9 x 1 m	4, 5	90 cm	3	
	Shelter E	9 x 1.5 m	1, 2, 3	37 cm	3	
41BL198	Subarea B	40 x 6 m	3, 4	30 cm	1, 5	human remains
41BL432	-	12 x 5 m	tufa only	n/a	1, 5	tufa sampled
41BL433	-	12 x 3.5 m	1, 2, 3	60 cm	1, 3	
41BL538	-	14 x 3 m	1, 2, 3	60 cm	1	
41BL567	-	30 x 3 m	1, 2	56 cm	1	
41BL568	Shelter C	5 x 2.5 m	1, 2	40 cm	1, 3, 4	
41BL744	-	26 x 6 m	1, 2, 3	60 cm	1	human remains
41BL754	-	12 x 1 m	2, 3	62 cm	1, 3	
41BL765	-	40 x 5 m	1, 2, 3, 4	62 cm	1, 3, 5	tufa sampled
41BL886	Shelter A	25 x 5 m	1, 2, 3, 4	190 cm	1, 5	
	Shelter B	3 x 2 m	5, 6, 7	90 cm	1	
41CV1008[b]	Subarea A	45 x 10 m	2, 3	23 cm	1, 3	human remains
41CV1011	-	n/a	1, 2, 3	150 cm	n/a	testing of talus only
41CV1085	-	15 x 5 m	1, 2, 3, 4	118 cm	1	

[a] See Table 9.15.
[b] Not included in synthetic discussion in this chapter.

of the tools were manufactured elsewhere and carried in to the shelter. One anomaly of note is the very large faunal record preserved in 41BL886, which is out of proportion with all of the other shelters (see Figure 9.16). However, as the breakdown of faunal taxa (Table 9.12) indicates, this record is much more diverse than the other shelters, and includes a variety of large and small carnivores (e.g., black bear, bobcat, *Canis* sp., etc.), and rodent remains (e.g., wood rats, cotton rats) that are generally absent elsewhere. This suggests that the shelters at 41BL886 were used as dens by nonhuman predators during periods when they were not occupied by people, and the faunal record therefore represents an admixture of cultural and noncultural bone.

Still other shelters appear to represent short-term occupations where a limited suite of activities were conducted. The best example of this type of assemblage is provided by 41BL538, although 41BL198, 41BL568, 41BL744, 41BL765, and 41CV1085 also conform to this broad pattern (see Figure 9.16). Here again, the relative frequency of tools and projectile points tends to be greater than the relative frequency of debitage, suggesting that most tools were manufactured elsewhere and carried in. However, at least one of the relatively low-return shelters (e.g., 41CV1085) did produce a significant quantity of debitage. The relative frequency of faunal remains is variable, suggesting that while some of the shelters were probably butchering/cooking loci, food preparation was not particularly important in others. Interestingly, the presence of cores does not correspond to the sites with a higher incidence of debitage. This is highly counterintuitive, and remains unexplained. It may be simply a result of the small sample size.

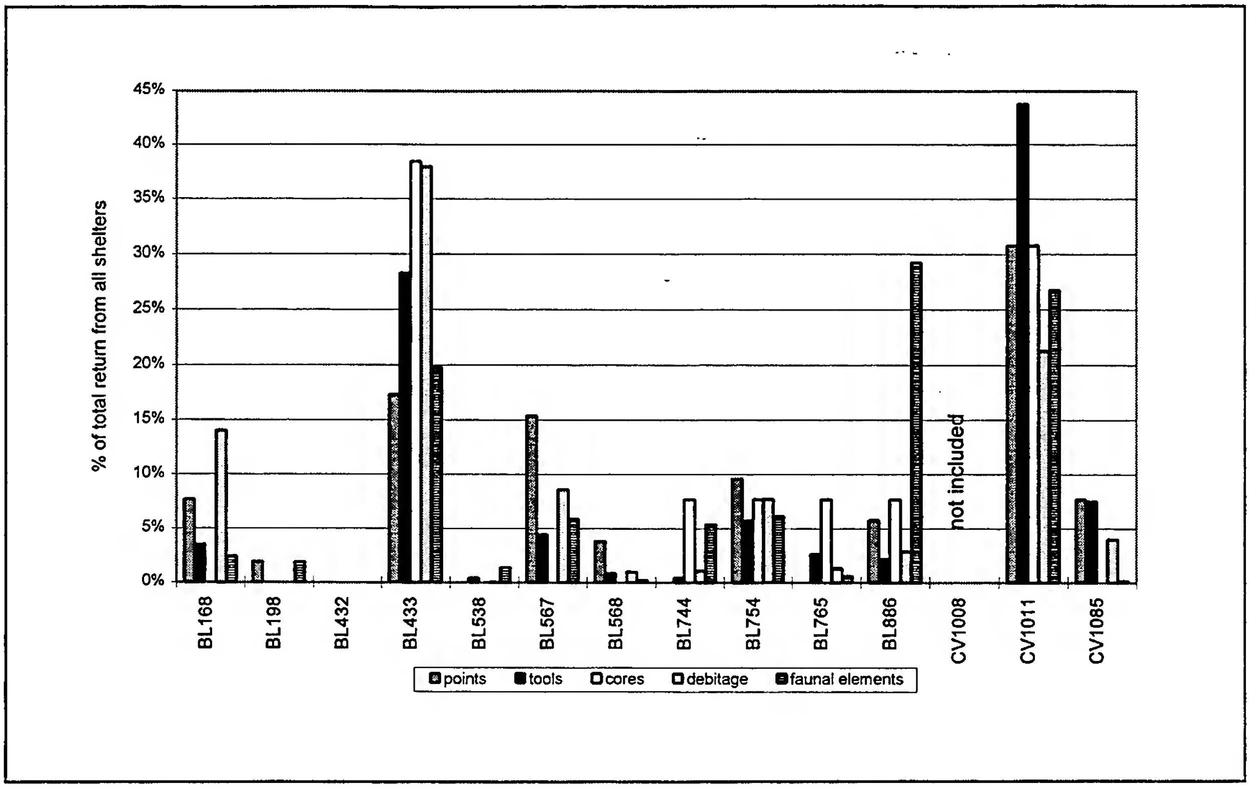

Figure 9.16 Artifact Return from Tested Rockshelters (41CV1008 not included).

Although only a limited suite of samples (n=30) were submitted, macrobotanical remains recovered from the shelters were very sparse (Table 9.13). Moreover, fully half of the recovery consists of uncarbonized remains, which almost certainly represent intrusive material (see Appendix G). The majority of carbonized remains consist of wood charcoal (sycamore, juniper, live oak, and pecan) that probably represent fuel consumed in features. The only remains that potentially represent food remains (c.f. Medsger 1973) are a walnut shell fragment, a hackberry seed, and a milk vetch (*Vicia* sp.) seed.

Temporal patterns of occupation in the shelters are broadly consistent with trends noted during the preceding work phase and elsewhere in Central Texas (Abbott 1994). Three distinct types of temporal data were collected from rockshelters during the testing phase. The first of these, diagnostic projectile points, is the most time-honored mechanism of temporal inference in Central Texas archeology, and the most open to criticism (cf. Ellis et al. 1994:42-58). The projectile points recovered during testing are summarized in Table 9.14. Although three Middle Archaic points were recovered, the majority of points date to the Late/Transitional Archaic (33%) through Late Prehistoric (62%). This fits well with the other two types of temporal data, which consist of (1) radiocarbon ages on wood charcoal and snail shell, and (2) age estimates based on aggregate A/I ratios of *Rabdotus* snails regressed against radiocarbon-dated snail shells with known ratios (see section 9.3 and Ellis and Goodfriend 1994). These data are presented in Figure 9.17. As indicated in the figure, radiocarbon ages from shelter context ranged from 120 ± 70 BP at 41BL886 to 2610 ± 60 BP at 41CV1011. Average radiocarbon-equivalent A/I are in the same general range, with values between approximately 400 and 2500 BP. This suggests that occupation of the

Table 9.12 Faunal Assemblages from Tested Rockshelters by Taxon and Element.

Common Name	Taxon	Element	41BL168	41BL198	41BL433	41BL538	41BL567	41BL568	41BL744	41BL754	41BL765	41BL886	41CV1011	41CV1085	Total
VERTEBRATA															
deer	*Odocoileus* sp.	antler	0	0	1	0	0	0	0	0	0	0	0	0	1
		mandible	0	0	0	0	0	0	0	0	0	0	1	0	1
		permanent tooth	1	0	2	0	0	0	0	1	0	0	5	0	9
		proximal phalange	0	0	0	0	0	0	0	0	0	2	0	0	2
		pooth	0	0	1	0	0	1	0	0	0	0	8	0	10
		Subtotal	1	0	4	0	0	1	0	1	0	2	14	0	23
even-toed ungulates	Artiodactyla	astagalus	0	0	0	0	0	0	1	0	0	0	0	0	1
		calcaneus	0	0	0	0	0	0	0	0	0	1	0	0	1
		femur	0	0	0	0	0	0	0	0	1	0	3	0	4
		fused 2 & 3rd carpal	0	0	0	0	0	0	0	0	0	0	1	0	1
		fused 3 & 4th carpals	0	0	2	0	0	0	0	0	0	0	0	0	2
		fused 3 & 4th metatar	0	0	2	0	0	0	2	0	0	2	7	0	13
		lumbar vertebra	0	0	0	0	0	0	0	0	0	0	2	0	2
		mandible	0	0	0	0	0	0	0	0	0	0	2	0	2
		metapodial	0	0	0	0	0	0	0	0	0	2	0	0	2
		proximal phalange	0	0	0	0	1	0	1	0	0	0	0	0	2
		radialcarpal	0	0	0	0	0	0	0	0	0	0	1	0	1
		tibia	0	0	1	0	0	0	0	0	0	2	0	0	3
		tooth	1	0	0	0	0	0	0	0	0	0	0	0	1
		ulna	0	0	0	0	0	0	0	1	0	0	1	0	2
		Subtotal	1	0	5	0	1	0	4	1	1	7	17	0	37
bison/cow	*Bos/Bison*	fibula	0	0	0	0	0	0	0	0	0	0	1	0	1
		permanent tooth	0	0	0	0	0	0	0	1	0	0	0	0	1
		Subtotal	0	0	0	0	0	0	0	1	0	0	1	0	2
bison	cf. *Bison bison*	radius	0	0	0	0	0	0	0	0	0	0	1	0	1
dog/wolf/coyote	*Canis* sp.	radius	0	0	0	0	0	0	0	0	0	1	0	0	1
blackbear	*Ursus Americanus*	metapodial	0	0	0	0	0	0	0	0	0	1	0	0	1
bobcat	*Felis rufus*	middle phalange	0	0	0	0	0	0	0	0	0	1	0	0	1
carnivore	Carnivora	mandible	0	0	0	0	0	0	0	0	0	1	0	0	1
		metapodial	0	0	1	0	0	0	0	0	0	0	0	0	1
		permanent tooth	0	0	0	0	0	0	0	0	0	8	0	0	8
		Subtotal	0	0	1	0	0	0	0	0	0	9	0	0	10
weasels, minks, skunks	Mustelidae	humerus	0	0	0	0	0	0	0	0	0	2	0	0	2
		ulna	0	0	0	0	0	0	0	0	0	1	0	0	1
		Subtotal	0	0	0	0	0	0	0	0	0	3	0	0	3

Table 9.12 Continued.

Common Name	Taxon	Element	41BL168	41BL198	41BL433	41BL538	41BL567	41BL568	41BL744	41BL754	41BL765	41BL886	41CV1011	41CV1085	Total
rat-sized cricetid rodent	Cricetidae (medium)	femur	0	0	0	0	0	0	0	0	0	4	0	0	4
		radius	0	0	0	0	0	0	0	0	0	1	0	0	1
		ulna	0	0	0	0	0	0	0	0	0	1	0	0	1
		Subtotal	0	0	0	0	0	0	0	0	0	6	0	0	6
nine-banded armadillo	*Dasypus novemcinctus*	calcaneus	0	0	0	0	0	0	0	1	0	0	0	0	1
		dermal armor	0	0	0	0	0	0	0	1	0	0	0	0	1
		Subtotal	0	0	0	0	0	0	0	2	0	0	0	0	2
opossum	*Didelphis virgiania*	atlas	0	0	0	0	0	0	0	0	0	1	0	0	1
		cervical vertebra	0	0	0	0	0	0	0	0	0	3	0	0	3
		cranium	0	0	0	0	0	0	1	0	0	3	0	0	4
		epipubic bone	0	0	0	0	0	0	0	0	0	1	0	0	1
		femur	0	0	0	0	0	0	0	0	0	3	0	0	3
		fibula	0	0	0	0	0	0	0	0	0	2	0	0	2
		mandible	0	0	0	0	0	0	1	0	0	4	0	0	5
		metapodial	0	0	0	0	0	0	0	0	0	2	0	0	2
		pelvis	0	0	0	0	0	0	0	0	0	4	0	0	4
		permanent tooth	0	0	0	0	0	0	3	0	0	7	0	0	10
		radius	0	0	0	0	0	0	0	0	0	2	0	0	2
		ribb	0	0	0	0	0	0	1	0	0	0	0	0	1
		thoracic vertebra	0	0	0	0	0	0	0	0	0	2	0	0	2
		tibia	0	0	0	0	0	0	0	1	0	0	0	0	1
		ulna	0	0	0	0	0	0	0	0	0	2	0	0	2
		Subtotal	0	0	0	0	0	0	6	1	0	36	0	0	43
plains pocket gopher	*Geomys bursarius*	humerus	0	0	0	0	0	0	0	0	0	1	0	0	1
cottontail rabbit	*Sylvilagus* sp.		0	0	0	0	0	0	0	0	0	2	0	0	2
		calcaneus	0	0	0	0	0	0	1	0	0	0	0	0	1
		cervical vertebra	0	0	0	0	0	0	0	0	0	2	0	0	2
		cranium	0	0	0	0	0	0	2	0	0	2	0	0	4
		deciduous tooth	0	0	0	0	0	0	0	0	0	2	0	0	2
		femur	0	0	0	0	0	0	0	0	0	3	0	0	3
		humerus	0	0	1	0	0	0	0	0	0	2	0	0	3
		lumbar vertebra	0	0	0	0	0	0	0	0	0	3	0	0	3
		mandible	0	0	0	1	0	0	2	0	0	5	2	0	10
		metacarpal 3	0	0	0	0	0	0	0	0	0	1	0	0	1
		middle phalange	0	0	0	0	0	0	0	0	0	2	0	0	2
		pelvis	1	0	0	0	0	0	2	0	0	4	0	0	7
		permanent tooth	0	0	0	0	0	0	8	0	0	5	1	0	14
		proximal phalange	0	0	0	0	0	0	0	0	0	1	0	0	1

Table 9.12 Continued.

Common Name	Taxon	Element	41BL168	41BL198	41BL433	41BL538	41BL567	41BL568	41BL744	41BL754	41BL765	41BL886	41CV1011	41CV1085	Total
		scapula	0	0	0	0	0	0	0	0	0	2	0	0	2
		tibia	0	0	0	0	0	0	2	1	0	2	0	0	5
		Subtotal	1	0	1	1	0	0	17	1	0	38	3	0	62
Jackrabbit	*Lepuis californicus*	cranium	0	0	0	0	0	0	0	0	0	1	0	0	1
rabbit sand hares	Leporidae	deciduous tooth	0	0	0	0	0	0	0	0	0	1	0	0	1
		lumbar vertebra	0	0	0	0	0	0	0	0	0	1	0	0	1
		mandible	0	0	0	0	0	0	0	0	0	1	0	0	1
		permanent tooth	0	0	0	0	0	0	0	0	0	1	0	0	1
		Subtotal	0	0	0	0	0	0	0	0	0	4	0	0	4
raccoon	*Procyon lotor*	metacarpal 3	0	0	0	0	0	0	0	0	0	4	0	0	4
		pelvis	0	0	0	0	0	0	0	0	0	1	0	0	1
		radius	0	0	0	0	0	0	0	0	0	0	1	0	1
		thoracic vertebra	0	0	0	0	0	0	0	0	0	1	0	0	1
		ulna	0	0	0	0	0	0	0	0	0	3	0	0	3
		Subtotal	0	0	0	0	0	0	0	0	0	9	1	0	10
woodrats	*Neotoma* sp.	cranium	0	0	0	0	0	0	0	0	0	1	0	0	1
		femur	0	0	0	0	0	0	0	0	0	1	0	0	1
		humerus	0	0	0	0	0	0	0	0	0	1	0	0	1
		mandible	0	0	0	0	0	0	0	0	0	2	0	0	2
		permanent tooth	0	0	0	0	0	0	0	0	0	1	0	0	1
		tibia	0	0	0	0	0	0	0	0	0	2	0	0	2
		Subtotal	0	0	0	0	0	0	0	0	0	8	0	0	8
cotton rats	*Sigmondon* sp.	femur	0	0	0	0	0	0	0	0	0	1	0	0	1
		humerus	0	0	0	0	0	0	0	0	0	2	0	0	2
		mandible	0	0	0	0	0	0	0	0	0	8	0	0	8
		permanent tooth	0	0	0	0	0	0	0	0	0	26	0	0	26
		tibia	0	0	0	0	0	0	0	0	0	6	0	0	6
		Subtotal	0	0	0	0	0	0	0	0	0	43	0	0	43
indeterminate rodents	Large	caudal vertebra	0	0	0	0	0	0	0	0	0	1	0	0	1
	Medium	cervical vertebra	0	0	0	0	0	0	0	0	0	1	0	0	1
		cranium	0	0	0	0	0	0	0	0	0	1	0	0	1
		femur	0	0	0	1	0	0	0	0	0	3	0	0	4
		pelvis	0	0	0	0	0	0	0	0	0	1	0	0	1
		permanent tooth	0	0	2	0	0	0	0	0	0	1	0	0	3
		tibia	0	0	0	0	0	0	0	0	0	3	0	0	3
		tooth	0	0	1	0	0	0	0	0	0	0	0	0	1
		Subtotal	0	0	3	1	0	0	0	0	0	10	0	0	14
	Small/medium	femur	0	0	0	0	0	0	0	0	0	2	0	0	2
		pelvis	0	0	0	0	0	0	0	0	0	1	0	0	1

Table 9.12 Continued.

Common Name	Taxon	Element	41BL168	41BL198	41BL433	41BL538	41BL567	41BL568	41BL744	41BL754	41BL765	41BL886	41CV1011	41CV1085	Total
		radius	0	0	0	0	0	0	0	0	0	1	0	0	1
		sacrum	0	0	0	0	0	0	0	0	0	1	0	0	1
		tibia	0	0	0	0	0	0	0	0	0	4	0	0	4
		Subtotal	0	0	0	0	0	0	0	0	0	9	0	0	9
	Small	humerus	0	0	0	0	0	0	0	0	0	1	0	0	1
		mandible	0	0	0	0	0	0	0	0	0	1	0	0	1
		permanent tooth	0	0	0	0	0	0	0	0	0	1	0	0	1
		scapula	0	0	0	0	0	0	0	0	0	1	0	0	1
		Subtotal	0	0	0	0	0	0	0	0	0	4	0	0	4
indeterminate mammals	Mammalia	indeterminate	0	0	0	0	2	0	5	0	0	4	2	2	15
	Very large	indeterminate	0	0	0	0	0	0	0	0	0	1	2	0	3
	Large/very large	indeterminate	0	0	0	0	0	0	0	0	0	0	5	0	5
		ribb	0	0	0	0	0	0	0	0	0	0	1	0	1
		Subtotal	0	0	0	0	0	0	0	0	0	0	6	0	6
	Medium/large	caudal vertebra	0	0	0	0	0	0	0	0	0	1	0	0	1
		cranium	0	0	2	0	0	0	0	0	0	2	0	0	4
		indeterminate	12	11	107	13	9	1	16	52	0	129	306	0	656
		longbone	0	0	0	0	0	0	0	0	0	1	0	0	1
		ribb	0	0	0	0	0	0	0	1	0	2	0	0	3
		vertebra	0	0	0	0	1	0	0	0	0	0	0	0	1
		Subtotal	12	11	109	13	10	1	16	53	0	135	306	0	666
	Medium	caudal vertebra	0	0	0	0	0	0	0	0	0	1	0	0	1
		ribb	0	0	0	0	0	0	0	0	0	1	0	0	1
		Subtotal	0	0	0	0	0	0	0	0	0	2	0	0	2
	Small/medium	caudal vertebra	0	0	0	0	0	0	0	0	0	3	0	0	3
		cranium	0	0	0	0	0	0	0	0	0	5	0	0	5
		indeterminate	0	0	1	0	0	0	0	0	0	2	0	0	3
		longbone	0	0	0	0	0	0	0	0	0	5	0	0	5
		lumbar vertebra	0	0	0	0	0	0	0	0	0	3	0	0	3
		metapodial	0	0	0	0	0	0	1	0	0	1	0	0	2
		proximal phalange	0	0	0	0	0	0	0	0	0	2	0	0	2
		radius	0	0	0	0	0	0	0	0	0	1	0	0	1
		ribb	0	0	0	0	0	0	1	0	0	6	0	0	7
		sacrum	0	0	0	0	0	0	0	0	0	1	0	0	1
		sternum	0	0	0	0	0	0	0	0	0	1	0	0	1
		thoracic vertebra	0	0	0	0	0	0	0	0	0	2	0	0	2
		tibia	0	0	0	0	0	0	0	0	0	1	0	0	1
		Subtotal	0	0	1	0	0	0	2	0	0	33	0	0	36

Table 9.12 Continued.

Common Name	Taxon	Element	41BL168	41BL198	41BL433	41BL538	41BL567	41BL568	41BL744	41BL754	41BL765	41BL886	41CV1011	41CV1085	Total
	Small/very small	cranium	0	0	0	0	0	0	0	0	0	1	0	0	1
		lumbar vertebra	0	0	0	0	0	0	0	0	0	1	0	0	1
		scapula	0	0	0	0	0	0	0	0	0	1	0	0	1
		Subtotal	0	0	0	0	0	0	0	0	0	3	0	0	3
	Very small	indeterminate	0	0	0	0	0	0	0	0	0	0	1	0	1
birds	Large	coracoid	0	0	0	0	0	0	0	0	0	2	0	0	2
		femur	1	0	0	0	0	0	0	0	0	0	0	0	1
		humerus	0	0	0	0	0	0	1	0	0	2	0	0	3
		longbone	0	0	2	0	0	0	0	0	0	0	0	0	2
		tibiotarsus	0	0	0	1	0	0	0	0	0	0	0	0	1
		Subtotal	1	0	2	1	0	0	1	0	0	4	0	0	9
	Medium	humerus	0	0	0	0	0	0	0	0	0	1	0	0	1
	Small	radius	0	0	0	0	0	0	0	0	0	1	0	0	1
		ulna	0	0	0	0	0	0	0	0	0	1	0	0	1
		Subtotal	0	0	0	0	0	0	0	0	0	2	0	0	2
box turtles	*Terrapene* sp.	pleural	0	0	0	0	0	0	1	0	0	0	0	0	1
turtles	Testudinata	plastron	0	0	1	0	0	0	0	0	0	0	0	0	1
		pleural	0	0	1	0	0	0	0	1	0	0	0	0	2
		shell	0	0	0	0	0	0	1	0	0	0	0	0	1
		Subtotal	0	0	2	0	0	0	1	1	0	0	0	0	4
pit viper snakes	Viperidae	dorsal vertebra	0	0	0	0	0	0	2	0	0	5	0	0	7
rattlesnake	cf. *Crotalus* sp.	dorsal vertebra	0	0	0	0	0	0	0	0	0	1	0	0	1
snakes	Serpentes	dorsal vertebra	0	0	0	0	0	0	0	0	0	1	0	0	1
		ribb	0	0	0	0	0	0	0	0	0	1	0	0	1
		Subtotal	0	0	0	0	0	0	0	0	0	2	0	0	2
bony fish	Osteichthyes	vertebra	0	0	0	0	1	0	0	0	0	0	0	0	1
indeterminate	Vertebrata	indeterminate	4	19	98	7	58	2	25	34	0	86	78	0	411
		long bone	0	0	1	0	0	0	0	0	0	1	0	0	2
		phalange	0	0	0	0	0	0	0	0	0	1	0	0	1
		Subtotal	4	19	99	7	58	2	25	34	0	88	78	0	414
INVERTEBRATA															
Three-ridge mussel	*Amblema plicata*		5	3	24	0	0	0	2	0	2	0	1	0	37
Threeridge family	Ambleminae		2	0	15	0	0	0	1	0	3	0	0	0	21
Fatmucket/Pocketbook/ Sandshell family	Lampsilinae		0	0	8	0	0	0	0	0	0	0	2	0	10
Louisiana Fatmucket	*Lampsilis hydiana*		0	0	2	0	0	0	0	0	0	0	0	0	2
Fatmucket/Pocketbook/ Sandshell family	*Lampsilis* sp.		1	0	1	0	0	0	1	0	0	0	0	0	3
Southern Mapleleaf	*Quadrula apiculata*		2	0	0	0	0	0	0	0	0	0	0	0	2

Table 9.12 Concluded.

Common Name	Taxon	Element	41BL168	41BL198	41BL433	41BL538	41BL567	41BL568	41BL744	41BL754	41BL765	41BL886	41CV1011	41CV1085	Total
Smooth Pimpleback	*Quadrula houstonensi*		1	0	0	0	0	0	0	0	0	0	0	1	2
Pimpleback/Mapleleaf/ Monkeyface family	*Quadrula* sp.		0	0	1	0	0	0	0	0	0	0	0	0	1
Lilliput family	*Toxolasma* sp.		0	0	0	0	0	0	0	0	0	1	0	0	1
Texas Lilliput	*Toxolasma texasensis*		0	0	1	0	0	0	1	0	0	0	0	0	2
Pistol grip	*Tritigonia verrucosa*		0	0	6	0	0	0	1	0	0	0	0	0	7
Unidentified freshwater mussels	Unionacea		0	0	3	0	0	0	1	0	0	0	0	0	4
Invertebrate Total			31	33	288	23	72	4	87	95	6	476	435	3	1,553

Table 9.13 Macrobotanical Remains from Tested Rockshelters.

			BL168	BL433	BL538	BL567	BL568	BL744	BL754	BL765	BL886	CV1085	Grand Total
NOT CARBONIZED													
Ash Juniper	*Junperis ashei*	Leaf	1	2	0	1	0	0	0	0	0	0	4
		Seed	1	1	0	0	0	0	0	0	0	0	2
		Wood	1	0	0	0	0	0	0	0	0	0	1
Grass Family	Poaceae	Culm	1	0	0	0	0	0	0	0	0	0	1
Hackberry	*Celtis* sp.	Seed	0	0	0	1	0	0	0	0	0	0	1
Indeterminate	Indeterminate	Root	0	1	0	0	0	0	0	0	0	3	4
		Seed	0	1	0	0	0	0	0	1	0	0	2
		Wood	0	1	0	0	0	0	1	0	0	0	2
Juniper	*Juniperus* sp.	Leaf	0	0	0	0	0	0	0	1	0	0	1
		Wood	1	0	1	0	0	0	0	0	0	0	2
Live Oak Wood Type	*Quercus* sp.	Nut	0	0	0	0	1	0	0	0	0	0	1
		Wood	0	1	0	0	0	0	0	0	0	0	1
Mexican Plum	*Prunus mexicana*	Seed	0	0	1	0	0	0	0	0	0	0	1
Pecan	*Carya illinoiensis*	Nut	0	1	0	0	0	0	0	0	0	0	1
Pepper Vine	*Ampelopsis* sp.	Seed	0	0	0	0	0	1	0	1	0	0	2
Plateau Live Oak	*Quercus fusiformis*	Nut	1	0	0	0	0	0	0	0	0	0	1
Uncarbonized Subtotal			6	8	2	2	1	1	1	3	0	3	27
CARBONIZED													
American Sycamore	*Platanus occidontalis*	Wood	0	0	0	0	0	0	1	0	0	0	1
Ash Juniper	*Junperis ashei*	Seed	0	1	0	0	0	0	0	0	0	0	1
Indeterminate	Indeterminate	Root	0	1	0	0	0	0	0	0	0	0	1
		Seed	0	0	0	0	0	1	0	0	0	0	1
		Wood	0	1	0	1	0	0	1	0	0	0	3
Juniper	*Juniperus* sp.	Seed	0	0	0	0	0	0	1	0	0	0	1
		Wood	0	0	0	3	0	0	0	2	0	0	5
Live Oak Wood Type	*Quercus* sp.	Wood	1	4	0	3	0	0	0	0	1	0	9
Milk Vetch	*Vicia* sp.	Seed	0	0	0	0	0	0	1	0	0	0	1
Netleaf Hackberry	*Celtis reticulata*	Seed	0	1	0	0	0	0	0	1	1	0	3
Pecan	*Carya illinoiensis*	Wood	0	0	0	1	0	0	0	0	0	0	1
Walnut	*Juglans* sp.	Nut	0	0	0	1	0	0	0	0	0	0	1
Carbonized Subtotal			1	8	0	9	0	1	4	3	2	0	28
Grand Total			7	16	2	11	1	2	5	6	2	3	55

Table 9.14 Projectile Points Recovered from Tested Rockshelters by Site and Time Period.

Period	Point Type	41BL168	41BL198	41BL433	41BL567	41BL568	41BL754	41BL886	41CV1011	41CV1085	Total
Middle Archaic	Travis	0	0	0	0	0	0	0	0	1	1
	Pedernales	0	2	0	0	0	0	0	1	0	1
	Subtotal	0	2	0	0	0	0	0	1	1	2
Late/ Transitional Archaic	Castroville	1	0	0	0	0	0	0	0	0	1
	Darl	1	0	0	1	0	0	0	2	0	4
	Edgewood	0	0	0	0	0	0	0	1	0	1
	Ellis	0	0	0	0	1	0	0	0	0	1
	Fairland	0	0	0	0	0	0	0	1	0	1
	Other Dart	1	0	2	2	1	0	0	3	0	9
	Subtotal	3	0	2	3	2	0	0	6	0	16
Late Prehistoric	Bonham	0	0	3	0	0	1	0	0	0	4
	Bulbar Stemmed	1	0	0	0	0	0	1	0	0	2
	Cliffton	0	0	0	0	0	0	0	1	0	1
	Perdiz	0	0	1	0	0	1	0	1	1	4
	Sabinal	0	0	0	0	0	1	0	0	0	1
	Scallorn	0	0	2	3	0	0	2	6	0	13
	Other Arrow	0	0	1	2	0	2	0	0	2	7
	Subtotal	1	0	7	5	0	5	3	8	3	32
Grand Total		4	0	9	8	2	5	3	16	4	51

shelters on Fort Hood was, for the most part, a phenomenon of the Late Archaic through Late Prehistoric periods. The significance of this association is addressed below in section 9.4.2.

While the patterns detailed above are interesting, it must be noted that they are the product of limited investigations that may not be representative of the shelters as a whole. In most cases, excavation units were situated to avoid obvious vandal pits, and thus may have missed the most productive areas of the shelters (many of which are probably largely destroyed, anyway). Therefore, the preceding should be considered as preliminary observations only, and require testing with a well-defined mitigation plan.

9.4.2 Geomorphic and Stratigraphic Observations

Examination of more than 150 rockshelters and karstic sinkholes on Fort Hood during the previous investigations (Trierweiler 1994) resulted in a number of general conclusions, including the identification of six distinct types of fill sediment (Abbott 1994:341-346). Although this subdivision has not proven drastically wrong, examination of shelter fills during the testing phase suggests that even this six part breakdown is simplistic. Table 9.15 outlines basic modifications to the shelter fill typology advanced in the previous report. Explanations of the proposed modifications are presented below.

Type 1 sediments represent limestone powder and eboulis derived from decomposition of the shelter walls and roof that have been subjected to relatively little pedogenic modification. In the previous document (Abbott 1994), this material was interpreted exclusively as inorganic sediments formed in this manner. However, field observations during the testing phase suggests that two other sources of sediment probably contribute to the overall suite of sediments interpreted as Type 1. The first consists of ash, which is the inorganic byproduct that remains following the

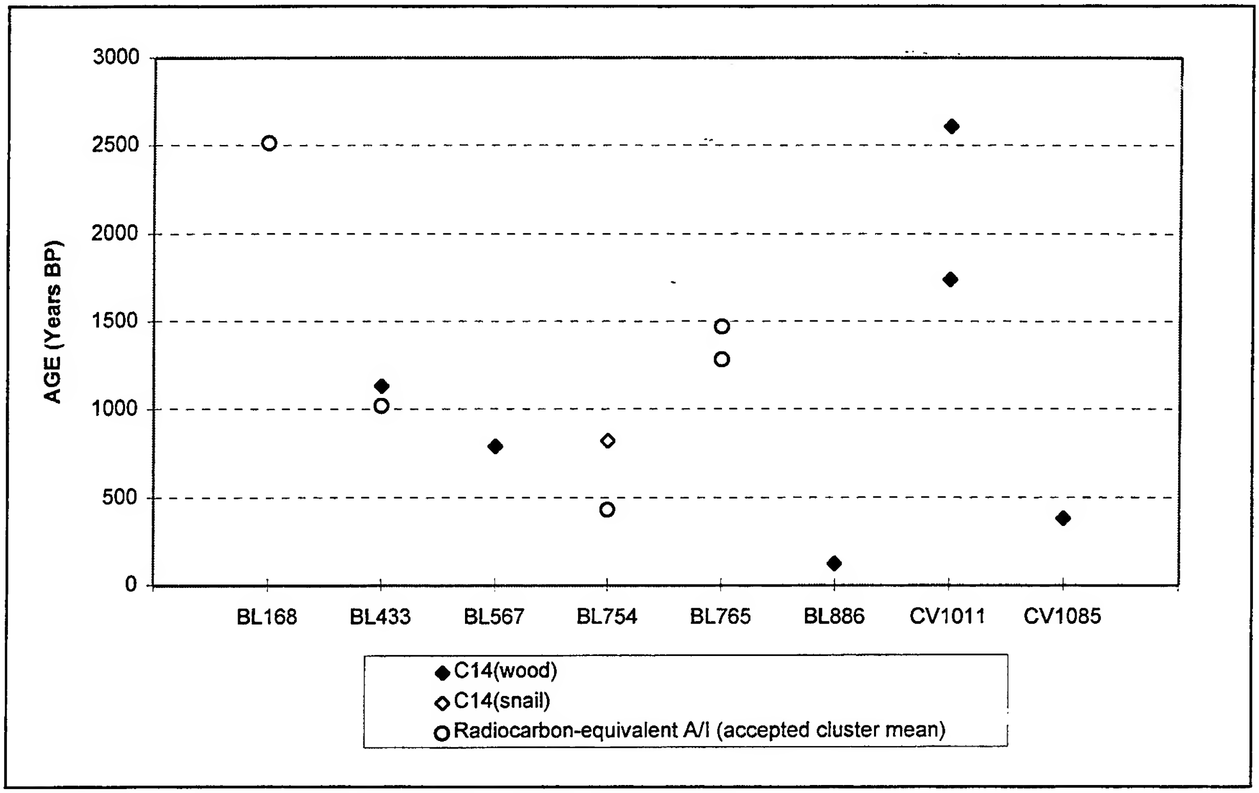

Figure 9.17 Chronometric Data from Tested Rockshelters.

complete combustion of plant products. Although it is recognized in micromorphological studies of archeological sediments (e.g., Courty et al. 1989), surprisingly little attention has been paid to ash either as an anthropic sediment in general (Stein 1985; Waters 1992) or as a component of rockshelter sediment in particular (e.g., Farrand 1985; Butzer 1978). In fact, although it appears to be composed largely of calcite crystals and silica (the latter probably representing the remains of plant phytoliths), the composition of ash, the biochemical transformations that create it, and the mass/volume ratios between fuel and resulting ash are poorly understood. Nevertheless, passive observation suggests that even a single campfire can produce an appreciable volume of ash, while innumerable fires built in a rockshelter, where much of the ash could be retained rather than blown away, could form a significant component of the overall fill. Examination of the various exposures provided in the rockshelters suggests that ash is frequently present, both as discrete lenses which are usually readily identified, and often as material dispersed throughout the matrix. The evidence for the latter is admittedly subjective; usually it consists of a grayish color and an ashy feel, which admittedly is very similar to the powdery feel of dry, unaltered shelter silt. Incorporation of the ash into the sediment probably occurs by a variety of processes, not the least of which is bioturbation by the same people building the fires in the first place. As noted previously (Abbott 1994; Ellis et al. 1994) the upper few centimeters of the typical dry, powdery (Type 1) shelter sediment is highly susceptible to mixing with even minimal amounts of foot traffic. Therefore, while ash is believed to be a frequently significant component of Type 1 sediments (and possibly of several of the other sediment types as well), assessment of its importance will involve

Table 9.15 Rockshelter Fill Typology.

Sediment Type	Abbott 1994		Modification (this report)	
	Description	Origin	Description	Origin
1	Light gray, gray-brown, yellowish brown or tan silt with various amounts of coarse limestone spall	Internal Decomposition of shelter walls and roof	As described previously, also includes sediments with high ash content and/or high organic content, particularly leaf litter or other organic matter decomposing in a relatively dry microenvironment	As described previously, but also includes additions of cultural sediment (e.g., ash) and organic sediment (e.g., decomposing leaf litter) blown, washed, or dropped into the shelter
2	Stratified, multicolored (red, orange, yellow, brown, gray, black, or white) silts with variable amounts of coarse incorporated spall and organic lenses	Internal Decomposition of shelter walls and roof; redox reactions due to intermittent saturation; organic-rich cultural strata	As described previously	As described previously
3	Dark grayish brown to black clay loam or stony clay loam; includes varying amounts of coarse limestone spall	Primarily deposition of external sediment derived from erosion of upland A horizon	As described previously	Probably much more weathered internal sediment than previously indicated
4	Reddish brown to red clay loam and stony clay loam	External sediment derived from erosion of upland Bt horizon; introduced over bluff and through spring conduits	As described previously; usually structureless, occasionally may exhibit blocky structure	Predominantly as described previously; in a few instances, the blocky structured sediment may represent an in situ Bt horizon
5	Tufa and travertine	Precipitation from groundwater in situ	As described previously; tufa predominant, commonly associated with abundant algal colonies	As described previously
6	Coarse lag/flushed shelters	Lack of accumulation and/or flushing by overland flow or groundwater discharge	As described previously	As described previously

chemical and/or micromorphological analysis of shelter sediments.

Another component that appears to be occasionally represented in Type 1 sediment is partially-divided to finely divided organic matter. Organic matter is a major component of Type 3 sediments, as has been noted previously (Abbott 1994) and also probably occasionally represents appreciable fractions of Type 2, 4, and 5 sediments (see section 9.4.3). Field inspection during the testing phase suggests that it can also be a major component of Type 1 sediments as well, but once again this conclusion is not yet supported by empirical laboratory data. This organic matter may have several sources, but most of it appears to represent disintegration of leaf litter (frequently juniper needles) blown, dropped, or (rarely) washed into the shelter setting. The major distinction that separates it from the organic component of Type 3 sediment appears to be dry decomposition, which renders it a dry, grayish powder rather than the black colloidal material resulting from chemical decomposition in the presence of appreciable moisture. Once again, this conclusion is preliminary and must be confirmed by detailed chemical and/or micromorphological analysis of the shelter sediments.

Type 2 sediments represent stratified, multicolored silts that are interbedded with coarse eboulis and organic lenses. They represent an end member related to Type 1 that have been substantially and differentially altered by redox reactions due to periodic groundwater discharge and/or intense heating, incorporation of cultural detritus, and variable degrees of weathering. In most cases, it is likely that these deposits represent relatively old matrix that has been substantially altered by diagenetic processes. Although none of the sites reported herein exhibited the classic, extreme variation of archetypal Type 2 sediments, many of the shelters with Type 1 sediments exhibited some internal variability that suggests incipient development of Type 2 morphology.

Type 3 sediments were originally interpreted primarily as exogamous fill derived from erosion of the A horizon of soils outside the shelter, and in many cases this indeed seems to be the case. However, observations during the testing phase suggest that much more than previously believed actually represents pedogenically altered endogamous sediment. Although direct evidence of sedimentation from outside the shelter was noted several times, one of the primary reasons that most of the material was previously interpreted as externally-derived soil material was that no mechanism of substantial organic incorporation, such as is evident in Type 3 sediments, was envisioned for areas inside the shelter. However, during the testing phase, several instances were observed where lightly weathered internal sediments (Type 1) merged laterally into highly weathered (Type 3) sediments with no discernable stratigraphic contact between them. Moreover, the overall testing experience suggests that most moist soils in shelters seem to be dark black clay loams (or tufa [Type 5]) suggesting that this type of sediment may arise spontaneously from weathering of the light gray limestone silt in moist conditions. The organic fraction appears to arise from several sources: (1) incorporation of leaf litter (see the discussion of Type 1 sediments); (2) roots growing in the moist areas (which proved to be very common); and (3) the incorporation of algae and lichen growing on the moist surfaces (which may be the major contributor to the organic content in many cases). Thus, while some Type 3 sediments do appear to represent eroded A horizons, much more than previously believed appear to represent in situ pedogenesis.

Type 4 sediments are typically structureless, reddish brown to red stony clay sediments previously interpreted as exogamous sediment derived from erosion of ancient upland Bt horizons. While most of these sediments are still believed to be the result of this process, at least one shelter (41BL504, which was examined in connection with a subsequent delivery order to be reported in a subsequent report) exhibited characteristics (strong angular blocky structure

and/or color variation with depth) that suggest that it may represent a Bt horizon developed in situ. Although this is not firmly established, if true it implies that the shelter has been extant and relatively stable for a considerable period, and thus represents an anomaly among shelters on Fort Hood investigated to this point. Therefore, like Type 3 sediments, the presence of Type 4 sediments can no longer be considered automatically indicative of outside sedimentation in the rockshelters on Fort Hood.

Type 5 sediments represent tufas and travertines, which are discussed below in section 9.4.3. Type 6 sediments represent shelters where erosion has flushed all fine-grained sediment away, leaving either bare limestone surfaces or a lag of coarse eboulis. No substantive changes or additions to the descriptions of either of these sediment types were suggested by work during the testing phase.

In addition to the sediment types, another consideration arising from geomorphic perspective on the rockshelter record concerns an apparent increase in rockshelter occupancy during the Late Archaic and Late Prehistoric that has been noted previously (eg., Shafer 1977; Thomas 1978) and is reflected in the temporal data collected during this phase of work. Previous authors (ibid.) have attributed this phenomenon to possible shifts in climate and resulting drying of previously wet shelters, rendering them increasingly attractive for habitation. However, as noted previously (Abbott 1994), examination of the extant record from Central Texas shelters indicates that (1) while Late Archaic and Late Prehistoric remains are clearly dominant, the full range of cultural traditions is represented to some degree, and (2) there is little indication that sterile sediments of greater antiquity are typically preserved beneath the cultural strata. While no early occupations were detected in rockshelter contexts during the present study, the second point was strongly supported. In short, no substantial accumulations of older, sterile sediment were apparent beneath the cultural strata in any of the shelters investigated. This implies that (1) the rockshelters either formed initially during the Late Holocene, or (more likely) (2) were flushed of sediment by increased discharge during the period following the Altithermal. Thus, while the hypothesis advanced by Shafer (1977) and Thomas (1978) (that the shelters were too wet to be occupied prior to the Late Archaic) may be partially true, there is no evidence to support it because the sediments that would contain a record of occupation are no longer extant. In other words, even if the shelters were occupied during the presumed wet phase, no record would be preserved. More importantly, any record of shelter occupation *predating* the presumed wet phase (e.g., the Paleoindian, Early Archaic, and possibly Middle Archaic periods) would also be absent due to geomorphic bias.

9.4.3 Paleoenvironmental Potential of Rockshelters

Steven A. Hall and James T. Abbott

As part of the overall effort, a pilot investigation was performed to evaluate the utility of travertine and tufa deposits in the rockshelters of Fort Hood as a source of paleoenvironmental data. Tufa and travertine deposits represent chemically-precipitated calcium carbonate that form around springs, seeps, in stream channels, in caves, and occasionally on the margin of lakes. Because the deposits can accrete relatively rapidly, they have considerable potential utility for paleoenvironmental studies. Travertine consists of dense, thin-laminated to microlaminated carbonate, while tufa typically has a spongy to vesicular structure (Bates and Jackson 1984). Much of the spongy structure of tufa appears to result from accretion in and around a mat of algae or bacteria, which can in fact chemically stimulate to the precipitation of the carbonate. On Fort Hood, tufa and, to a lesser extent, travertine are common surrounding active and fossil seeps and springs issuing out of the backs of rockshelters. These deposits, which typically consist of yellowish brown to tan spongy tufa interbedded with organic lenses, vary from sheet deposits a few centimeters thick to thick

mounds and columns that appear to be up to 2 m thick.

In rockshelters, the formation of tufa and travertine implies active groundwater discharge, and suggests that the rate of accretion should vary as a function of changes in regional precipitation. This general relationship has been confirmed by a number of researchers working at significantly longer time-scales (e.g., Harmon et al. 1977; Gordon et al. 1989; Szabo 1990). Thus, changes in the rate of travertine accumulation may provide a sensitive indicator of changes in precipitation rates throughout the Holocene, providing that the travertine sequence can be dated (at the same time, because tufa and travertine would not be flushed by increased spring discharge, dating of the sequence could potentially resolve the question of whether the shelters formed during the Late Holocene or were simply flushed of older sediment).

Uranium series dating (particularly $^{230}Th/^{234}U$) is the most commonly applied radiometric method of obtaining the age of chemically-identical cave speleothems, but the half-life of uranium is such that the method is not applicable to Holocene formations (Bradley 1985). Although the calcium carbonate that makes up tufa and travertine deposits can be directly dated by the radiocarbon method, the resulting ages are frequently unreliable in calcareous terrains due to the incorporation of dead carbon derived from the parent rocks. However, if fragments of organic matter derived from the surrounding environment are incorporated as the deposits accrete, which is very likely in relatively open settings of rockshelters, this material is amenable to AMS dating that can provide a good estimate of the time of deposition. Because travertine accumulates in laminar beds that frequently provide clear stratigraphic reference, careful selection of a relatively sparse suite of dates from the right sequence of deposits has the potential to provide a relatively high-precision record of fluctuations in regional precipitation through time. Although the stratigraphy of tufa deposits is typified by thicker, more poorly defined strata, it too can be identified at a resolution that is probably suitable for valid paleoclimatic inference. In many cases, indistinct stratigraphy can be enhanced by a variety of methods, including illumination with ultraviolet light (Shopov et al. 1994). The key to application of the method is careful selection of dating samples to effectively identify temporal gaps in the record that correspond to accretional hiatuses.

Several other lines of paleoenvironmental information are also potentially obtainable from travertine deposits. One of these lines of evidence is paleotemperature information provided by the analysis of the isotopic composition of oxygen incorporated into the travertine. Systematic, temperature-dependent variation in the fractionation of the $^{18}O/^{16}O$ isotopes of oxygen was initially recognized by Urey (1947), and was subsequently used to calculate variations in global temperature based on the isotopic composition of deep ocean sediments (Emeliani 1955). However, subsequent workers (e.g., Shackleton 1967; Dansgaard and Tauber 1969; Shackleton and Opdyke 1973) have argued that most of the observed changes in oxygen isotope composition are not due to temperature changes sensu stricto, but rather to changes in global ice volume. The basic argument is that during evaporation of seawater, a natural fractionation occurs as the lighter ^{16}O isotope is preferentially evaporated, rendering atmospheric water vapor isotopically lighter than the water in the oceans. During glacial periods, this water vapor is converted to precipitation, and subsequently bound up in the continental ice sheets, resulting in progressive enrichment of the ocean reservoir in the heavier ^{18}O isotope, while deglaciation frees the trapped lighter isotopes, which are returned to the sea in meltwater.

In terrestrial situations, oxygen isotopes do have a direct, albeit complex, relationship to temperature variations. For the same reason that isotopically light water (molecules containing ^{16}O) is preferentially evaporated, isotopically heavy water (molecules containing ^{18}O) tends to condense first, and the isotopic composition of precipitation

therefore contains a record of temperature. However, this record is far from straightforward, as the isotopic composition of an air mass is affected by a number of factors, including (1) the isotopic composition of the moisture source(s), (2) exchanges between water vapor and water droplets in the air, as well as with water on the ground, (3) the amount of moisture in the air relative to its original water content, (4) the kinematics of precipitation, (5) the temperature at the source, (6) distance from the source, and (7) the latitude of the source and study areas. Nevertheless, the $\delta^{18}O/^{16}O$ ratio terrestrial deposits has been successfully used to obtain analog records of paleoclimatic variation from a number of sources, including glacial ice (e.g., Paterson et al. 1977; Epstein et al. 1970), wood (e.g., Jacoby 1980; Gray and Thompson 1976), sedimentary and chemical lacustrine deposits (Müller and Wagner 1978; Abel et al. 1982), pedogenic carbonates (Allan and Matthews 1982; Magaritz 1983), cave speleothems (e.g., Harmon et al. 1977; Thompson et al. 1976), and tufas and travertines (Pazdur et al. 1988).

However, most authors (e.g., Bradley 1985, Lowe and Walker 1984) stress that temperature trends can only be obtained from flowstones (tufa, travertine, and speleothems) if the calcite is deposited under equilibrium conditions, such as occur only in deep caves where temperature and moisture fluctuations do not occur. The formation of tufa and travertine, in contrast, is a disequilibrium reaction stimulated to a large part by CO^2 degassing resulting from the emergence of groundwater (Michaelis et al. 1985). Despite this prevalent notion, promising results have been obtained from oxygen isotope studies of tufas and travertines in calcareous terrains (Padzur et al. 1988), and it is possible that a paleotemperature curve could be obtained from similar deposits on Fort Hood. However, such a curve would probably reflect a composite signature of the temperature of water as it emerged from the spring conduit and the isotopic composition of the original precipitation. Thus, factors that would have to be isolated include the seasonality of precipitation, which would have an effect on the isotopic composition (i.e., deposits laid down during the warm season would be expected to have a different composition than deposits formed during the cold season, and thus reflect annual rather than long-term variability) and the source area of precipitation (which differ markedly between Gulf and Pacific sources due to contrasting water temperatures).

Another promising avenue of paleoenvironmental research is provided by analysis of the isotopic composition of carbon incorporated into the travertine. Carbon occurs in three basic isotopic forms: ^{14}C, which is radioactive and forms the basis of radiocarbon dating, and ^{12}C and ^{13}C, which are both isotopically stable. In sum, roughly 98.9% of the carbon in circulation is ^{12}C and 1.1% ^{13}C; only 1.18×10^{-10}% is ^{14}C (Lowe and Walker 1984). However, biological processes tend to fractionate ^{12}C and ^{13}C, such that the ratio between the two reflects the metabolic pathway of the organism that fixed the carbon into its structure. Three different metabolic pathways are recognized in plants: the Calvin-Benson pathway (CAL or C_3) pathway, which is typical of most plants (including almost all plants in the temperate regions) and has a typical fractionation of approximately -22‰ to -33‰; the Hatch-Slack (HS or C_4) pathway, which is typical of tropical grasses (including some grain crops) and has a typical fractionation of -9‰ to -16‰; and the CAM (crassulacean acid metabolism) pathway, which utilizes both of the other pathways depending on temperature and photoperiod, has intermediate fractionation values, and is typical of succulents like cactus (van der Merwe 1982; DeNiro 1987). Stable carbon isotope analysis of faunal (Schoeninger and DeNiro 1984) and human (Huebner and Comuzzie 1992; DeNiro 1987) remains has demonstrated that $\delta^{13}C$ values reflect the composition of paleodiet. In the southern Plains, a great deal of attention rests on systematic variation in $\delta^{13}C$ of values that reflects climate-driven shifts in the relative abundance of C3 and C4 plants. In addition to studies of bone from animals feeding on the plant assemblage, this variability is reflected in the isotopic composition of soils and sediments supporting the vegetative

community (e.g., Nordt et al. 1994; Amundson et al. 1988). Because the water discharged from the springs and seeps on Fort Hood has filtered relatively rapidly through the soil system, it follows that these isotopic shifts may be reflected in the composition of isotopic carbon incorporated into the tufas and travertines through time, and may in fact preserve a better record than presented by sediments eroded from the soils and preserved in the valley systems because lag time and mixing should be minimized.

A final potential avenue of paleoenvironmental investigation concerns examination of material incorporated into tufas and travertines. In addition to providing material for dating, biotic remains trapped in the sediments as they accrete can provide a picture of the surrounding vegetative community. This is particularly true of pollen, which is airborne and therefore most likely to provide a regional picture of the composition of the vegetative community. However, the method is of use only if the level of incorporation and degree of preservation is sufficiently high to allow for statistically representative data. Examination of the pollen content of shelters sediments (Hall 1990-91) suggests that pollen grains undergo rapid, differential destruction that limits their utility to paleoenvironmental reconstruction. However, the potential of tufa and travertine deposits in the same context to trap and preserve a pollen record remains high.

Despite this potential, the palynology of travertine has not been widely attempted. In one study, some, but not all, of Pleistocene travertine in the eastern Mediterranean yielded pollen (Weinstein-Evron 1987), while another study of early Holocene travertines in Belgium contained assemblages reflecting short-term fluctuations in pollen production (Geurts 1988). While travertine has not been systematically analyzed for pollen in the United States, the senior author (Hall) has detected small amounts of pollen in Pleistocene, Holocene, and modern travertines from Texas and New Mexico. However, it has yet to been determined whether pollen analysis of travertine and tufa is a viable method of reconstructing paleovegetation and paleoenvironmental trends.

The purpose of the pilot study presented here was designed to determine the potential of such an effort to yield valuable paleoenvironmental information. A total of seven tufa samples were collected from two shelters (41BL432 and 41) and submitted for analysis by Hall. These samples included examples of both living (i.e., wet, spongy, relatively soft tufa covered with an algal mat) and dead (hard, dry, vesicular "popcorn" tufa) from deposits a few cm to more than a meter thick. Four of the samples (1, 2, 5, and 7) represent two pairs of stratigraphically-related subsamples. In each case, the bottom section can be confidently identified as older than the top section because they were taken from the same large block of living tufa. The other three samples represent single samples from deposits representing a variety of different morphologies. Analytical methods are presented in section 4.3. The results of the analysis are presented in Table 9.16.

The Fort Hood travertine contains large amounts of organic matter that includes pollen grains, fern spores, moss spores, fungal and algal spores, bodies, and cysts, arthropod eggs, and charcoal and charred particles, in addition to vast numbers of isolated plant cells and other parts of plant tissues. Pollen content ranges from 400 to 11,000 grains per gram of travertine processed, although four of the seven samples have less than 1,000 grains per gram. Nevertheless, preservation of the pollen grains is generally good.

The processes by which pollen and other organic matter become incorporated in travertine have not been studied. Travertine that forms in the open along streams or in springs may precipitate around pollen grains and other particles that adhere to wet carbonate surfaces. Travertine may also engulf organic-bearing sediment. There may be significant differences between the way organics are incorporated in travertine forming in the open from those that form in caves and rockshelters. The Fort Hood travertine incorporates some visible

Table 9.16 Results of Pollen Analysis from Tested Rockshelters.

Pollen Taxon	Sample Number 1	2	3	4	5	6	7
	rounded percentages						
Juniperus (cedar)	50	27	38	20	17	71	46
Quercus (oak)	18	18	15	32	21	10	27
Pinus (pine)	0	0	0	5	4	1	0
Fraxinus (ash)	0	0	0	0	0	5	6
Ulmus (elm)	4	0	0	5	0	1	0
Juglans (walnut)	4	0	0	7	4	2	0
Carya (hickory)	0	0	0	0	4	0	0
Celtis (hackberry)	0	9	0	0	0	0	0
Salix (willow)	0	0	0	2	0	0	0
Poaceae (grasses)	0	0	0	0	4	0	6
Ambrosia (ragweed)	0	0	8	10	12	2	0
Cirsium (thistle)	0	0	0	2	0	0	0
Liguliflorae (dandelion group)	0	9	0	0	0	0	0
Asteraceae (sunflower fam.)	4	9	23	15	4	2	3
Chenopod. (goosefoot fam.)	4	0	0	0	8	3	0
unknown	8	18	15	2	4	1	0
indeterminable	0	0	0	0	4	2	3
fern spores	4	9	0	0	12	1	9
pollen sum	22	11	13	41	24	219	33
spike count	19	9	14	8	9	15	82
sample weight (g)	113	88	47	83	61	60	41
pollen concentration/g	463	627	894	2,780	1,970	11,000	443
fungi/algae concentration/g	2,420	9,740	5,160	32,800	78,900	-	3,860
charcoal (>25 11 m) concentration/g	147	456	10,200	1,090	2,200	403	441

Pollen Samples:

1. 41BL765, subsample I, from tufa block "upper section," P #40.
2. 41BL432, subsample of sample 3, "bottom section," P #4.
3. 41BL432, tufa sample I, P #2.
4. 41BL432, sample 2--tufa, "popcorn" tufa from wall east of main mound, P #3.
5. 41BL432, subsample of sample 3, "top section," P #4.
6. 41BL432, tufa sample 4, sheet tufa from back wall near seep at top of mound.
7. 41BL765, subsample 2, from tufa block, "lower section," P #40.

Notes:

a. Both samples from 41BL765 contain abundant form of fungus not present elsewhere.
b. Samples 3 and 5 contain large amounts of small charcoal, <10 µm diameter.
c. Sample 4 residue contains enormous number of fungal bodies.
d. More than 40 different types of fungal and algal bodies and cysts were observed.

organic-rich sediment in small amounts. Thin-section analysis could identify organic-rich zones within the travertine microstratigraphy.

Small pollen counts from the travertine show a dominance of cedar and oak pollen with minor amounts of elm, walnut, ragweed, and other composites. Interestingly, both paired samples indicate an expansion of juniper at the expense of oak, suggesting that the sampled portion may date to the historic period. No data loss is apparent in the dead tufa; in fact, the two dead samples (4 and 6) yielded the highest pollen concentrations.

Considering the generally low concentrations of pollen observed by the senior author in pilot studies of other travertine, the Fort Hood travertine has a rather large amount of pollen and is suitable for traditional pollen analysis. In order to carry out such a study, however, the analyst will want to process the organic residue somewhat more harshly than usual in order to reduce the amount of plant tissues and other organics that overwhelm and mask pollen grains on slides. If the residue is treated to a hot acetolysis for 15 to 20 minutes followed by a 20 second wash in sodium hypochlorite, the organic content of the residue can be reduced to a manageable concentration where pollen grains are proportionately well represented.

In addition to pollen analysis, the organics in the travertine are suitable for radiocarbon dating, providing a date that eliminates the problems of dating inorganic carbon in carbonates. The Fort Hood travertine contains so much organic matter that it can be dated by conventional methods; of course, smaller amounts of organics can be dated by AMS.

As with any pollen analytical investigation, travertine pollen assemblages should come from a time series of deposits where the stratigraphy has been adequately described and dated. The Fort Hood material may yield a useable pollen record in Central Texas where past studies have generally failed to discover late Quaternary deposits containing well preserved pollen assemblages and where, as a consequence, vegetational and environmental history is poorly known. The Fort Hood travertine is a good potential resource for developing a useful pollen sequence, although, in order for it to succeed, additional effort to document travertine stratigraphy and chronology will be required.

9.4.4 Conclusions

In summary, the extensive rockshelter assemblage on Fort Hood contains a wealth of data critical to understanding the cultural, geomorphic, and paleoenvironmental record of the region. Unfortunately, the same features have proven to be particularly vulnerable to vandalism, which is rapidly degrading the quality of the resource. Another characteristic of rockshelters that is becoming increasingly obvious is their strong affinity with prehistoric burials. At least one well-defined burial was located (at 41BL744) and two additional sites also yielded human bone. Because this characteristic renders them subject to additional federal laws (e.g., NAGPRA), it increases the urgency to implement management policies that will arrest the cycle of vandalism and preserve the resource.

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APPENDIX A

SITE DATA

(Contains restricted locational information; original on file at Fort Hood)

APPENDIX B

FEATURE DATA

Table B-1 Feature Data.

SITE	FEA. ID	ROCK SHELTER	LEVELS	UNIT	TYPE	VIS ON SURF	TW (M)	TL (M)	TOP DEP (CM)	BTM DEP (CM)	SIZE EST.	ROCK TIERS	ROCK SIZE	ROCK SHAPE	REL. FEA.	ASH CHARC PRES.	BURN EARTH	DISCOLOR	DISTURB	ITU CR	INT STRUCT	NEST. FEAT	% EXCAV	PLAN SHAPE	PORT EXCAV	PROFILE SHAPE
BL154						F	0	0	0	0	F											F				
BL154	1	NA	1-11,1-7	TP1,3	BRM	T	50	150	0	110	T	NR	11-20CM	NR	NONE	NR	NR	NR	mixed n&c	NR	POSS	F	1-25%	Amorp	UNK	amorph
BL154	2	NA	25	TP2,BT6	hearth ang rock	F	0.23	0.49	240	247	T	1 Tier	NR	SUB	NONE	NR	NR	NR	none	NR	POSS	F	1-25%	circ	NORTH	NR
BL154	3	NA	13-14	TP4	BRC	F	0	0	125	137	T	2 Tiers	5-10CM	ANG	NONE	NR	NR	NR	ROOT	NR	POSS	F	1-25%	Amorp	UNK	NR
BL168						F	0	0	0	0	F											F				
BL198						F	0	0	0	0	F											F				
BL198	1	NA	1-9	TP2	ABM	T	12	12	0	90	T	NR	5-10CM	ANG	NONE	NR	NR	NR	mixed n&c	NR	NONE	F	1-25%	ovate	CENTER	PILED
BL198	2	NA	1-5	TP2	ABM	T	9	9	0	50	T	NR	5-10CM	ANG	NONE	NR	NR	NR	mixed n&c	NR	INDET	F	1-25%	circ	CENTER	PILED
BL208						F	0	0	0	0	F											F				
BL208	1	NA	N/A	N/A	caches	T	3.7	5.1	0	0	F	N/A	N/A	N/A	NONE	N/A	N/A	N/A	multi cult	N/A	POSS	F	100%	Amorp	ALL	FLAT
BL339						F	0	0	0	0	F											F				
BL339	1	NA	N/A	BT5	hearth ang rock	F	0	0.58	290	300	T	NR	NR	NR	NONE	P	NR	NR	none	NR	POSS	F	NT	unk	NONE	UNK
BL339	2	NA	7-9	TP1,BT	basin slab lined	F	0.5	0.6	62	84	F	2 Tiers	11-20CM	SLAB	NONE	NR	NR	NR	ROOT	NR	VISIBLE	F	51-75%	Amorp	all	PILED,BASIN
BL339	3	NA	13-15	TP5	ussel shell midde	T	2	2.5	130	146	T	N/A	N/A	N/A	NONE	N/A	N/A	N/A	none	N/A	POSS	F	26-50%	Amorp	CENTER	BASIN
BL339	4	NA	15-17	TP4	BRM	F	0	0	140	170	T	NR	5-10CM	ANG	F4A	NR	NR	NR	none	NR	POSS	T	76-99%	Amorp	UNK	NR
BL339	4A	NA	17-18	TP4	basin w/ rock	F	0.7	0.8	165	179	T	3 Tiers	5-10CM	NR	F4	P	NR	NR	none	NR	VISIBLE	T	100%	ovate	ALL	BASIN
BL415						F	0	0	0	0	F											F				
BL415	1	NA		ST	BRC	T	3	18	0	0	T											F	NT			
BL415	2	NA	2-3	TP4	BRC	F	0.56	0.74	19	26	F	NR	5-10CM	SUB	NONE	NR	NR	NR	multi nat	NR	INDET	F	76-99%	Amorp	UNK	UNK
BL421						F	0	0	0	0	F											F				
BL427						F	0	0	0	0	F											F				
BL432						F	0	0	0	0	F											F				
BL433						F	0	0	0	0	F											F				
BL454						F	0	0	0	0	F											F				
BL470						F	0	0	0	0	F											F				
BL513						F	0	0	0	0	F											F				
BL513	1	NA	4-10	TP1-2,BT7	BRM	F	15	25	36	94	T	NR	5-10CM	ANG	NONE	NR	NR	NR	ROOT	NR	POSS	F	1-25%	Amorp	UNK	PILED
BL532						F	0	0	0	0	F											F				
BL538						F	0	0	0	0	F											F				
BL538	1	ND	3-4	TP2	slab lined hearth	F	0	0.77	25	35	T	1 Tier	5-10CM	SLAB	NONE	NR	NR	NR	none	NR	VISIBLE	F	1-25%	unk	UNK	BASIN
BL564						F	0	0	0	0	F											F				
BL564	1	NA	1-9	TP2	ABM	T	11	12	0	90	T	NR	5-10CM	ANG	NONE	NR	NR	NR	ROOT	NR	POSS	F	1-25%	circ	UNK	PILED
BL567						F	0	0	0	0	F											F				
BL567	1	ND	2-3	TP2	hearth ang rock	T	0.4	0.53	10	22	F	NR	5-10CM	NR	F2	NR	P	P	RODENT	NR	NR	F	100%	ovate	ALL	BASIN
BL567	2	ND	1-2	2	hearth,lit no rock	F	0.35	0.4	8	14	T	NR	11-20CM	NR	F1	A	P	P	MULTI BIO	NR	NR	F	26-50%	circ	NW	BASIN
BL568						F	0	0	0	0	F											F				
BL568	1	NA	1-14	TP3	DBM	T	11.5	13	0	140	T	NR	NR	NR	NONE	NR	NR	NR	multi nat	NR	NONE	F	1-25%	ovate	CENER	PILED
BL568	2	NA	1-8	TP4	DBM	T	10	12	0	80	T	NR	NR	NR	NONE	NR	NR	NR	multi nat	NR	NONE	F	1-25%	CRESC	CENTER	PILED
BL740						F	0	0	0	0	F											F				
BL740	1	NA	1-4	TP2	BRM	T	20	80	0	35	T	NR	5-10CM	NR	NRC	NR	NR	NR	V	NR	POSS	F	1-25%	LINEAR	NORTH	PILED
BL740	2	NA	3-5	BT2,TP5	BRM	F	0	0	20	50	T	NR	11-20CM	SUB	n	P	NR	NR	mixed n&c	NR	NR	F	1-25%	Amorp	midpoint	amorph
BL743	1	NA	1-6	TP,BT&ST1	DBM	T	10	12.5	0	53	T	NR	NR	SLAB	NONE	NR	NR	NR	mixed n&c	NR	INDET	F	1-25%	ovate	CENTER	PILED
BL744						F	0	0	0	0	F											F				
BL744	1	ND	6	TP2	burials	F	0.5	0.8	53	53	T	N/A	NR	N/A	NONE	A	N/A	A	MULTI BIO	N/A	POSS	F	1-25%	circ	SE	amorph
BL751						F	0	0	0	0	F											F				
BL751	1	NA	2-10	TP1	BRM	T	20	60	10	100	T	NR	11-20CM	SUB	NO	NR	NR	NR	V	NR	NR	F	1-25%	SEMIcirc	NORTH	PILED
BL754						F	0	0	0	0	F											F				
BL755						F	0	0	0	0	F											F				
BL755	1	NA	3-6	TP2	BRM	F	12	40	20	53	T	NR	11-20CM	SUB	NO	A	A	A	ROOT	NR	POSS	F	1-25%	Amorp	N-CENTRA	PILED
BL765						F	0	0	0	0	F											F				
BL821						F	0	0	0	0	F											F				
BL821	1	NA	1-19	TP2	BRM	T	30	75	0	190	T	NR	NR	ANG	NONE	NR	NR	NR	V	NR	NR	F	1-25%	LINEAR	CENTER	PILED
BL834						F	0	0	0	0	F											F				
BL853						F	0	0	0	0	F											F				
BL853	1	NA	NA	NA	BRC	T	30	50	0	0	T	NR	NR	NR	NONE	NR	NR	NR	mixed n&c	NR	POSS	F	NT	ovate	NONE	UNK
BL886						F	0	0	0	0	F											F				
BL888						F	0	0	0	0	F											F				
BL888	1	NA	4-6,7-10	TP1,TP3	BRM	T	50	60	30	100	T	3 Tiers	5-10CM	NR	F2	A	A	A	V	NR	VISIBLE	F	1-25%	Amorp	SECT OF S	PILED
BL888	2	NA	1-11	TP4	BRM	T	0	0	0	108	T	NR	5-10CM	NR	NO	NR	NR	NR	ROOT	NR	INDET	F	1-25%	unk	ECT OF N	PILED
CV1007						F	0	0	0	0	F											F				
CV1007	1	NA	1-13	TP1	BRM	T	14	29	0	130	T	NR	5-10CM	SUB	NONE	NR	NR	NR	V	NR	NR	F	1-25%	ovate	CENTER	PILED
CV1007	2	NA	7-9	TP2,BT1	BRC	F	0	0	63	81	T	NR	5-10CM	SUB	NONE	NR	P	P	MULTI BIO	RESEN	NR	F	1-25%	Amorp	UNK	PILED
CV1008						F	0	0	0	0	F											F				
CV1011						F	0	0	0	0	F											F				
CV1023						F	0	0	0	0	F											F				
CV1023	.1	NA	1	TP1	BRC	T	1	2	0	10	T	NR	5-10CM	NR	NRC	NR	NR	NR	mixed n&c	NR	NR	F	NT	unk	NONE	UNK
CV1023	2	NA	NA	NA	BRC	T	6	6	0	0	T	NR	5-10CM	ANG	NONE	A	A	A	mixed n&c	NR	NR	F	NT	circ	OT APPLI	UNK
CV1023	3	NA	1-3	TP3	BRC	T	3	3	9	21	T	NR	5-10CM	NR	NONE	NR	NR	NR	mixed n&c	NR	NR	F	1-25%	circ	CENTER	amorph
CV1023	4	NA	1	TP2	BRC	T	0.5	1	0	10	T	NR	NR	NR	NRC	NR	NR	NR	multi cult	NR	NR	F	1-25%	circ	CENTER	NR
CV1023	5	NA	1-3	TP6-7	BRM	T	9	16	0	30	T	NR	5-10CM	NR	NRC	NR	NR	NR	multi cult	NR	NR	F	1-25%	circ	SOUTH	PILED
CV1023	6	NA	1-2	TP4	BRC	T	3	3	5	15	T	NR	NR	NR	NRC	NR	NR	NR	mixed n&c	NR	NR	F	1-25%	circ	CENTER	PILED

Table B-1 Continued.

SITE	FEA. ID	ROCK SHELTER	LEVELS	UNIT	TYPE	VIS ON SURF	TW (M)	TL (M)	TOP DEP (CM)	BTM DEP (CM)	SIZE EST.	ROCK TIERS	ROCK SIZE	ROCK SHAPE	REL. FEA.	ASH CHARC PRES.	BURN EARTH	DISCOLOR	DISTURB	ITU CR	INT STRUCT	NEST. FEAT	% EXCAV	PLAN SHAPE	PORT EXCAV	PROFILE SHAPE
CV1027						F	0	0	0	0	F											F				
CV1027	1	NA	1-5	TP1-2,BT1	ABM	T	7	8	0	50	T	NR	5-10CM	NR	NRC	NR	NR	NR	MULTI BIO	NR	NR	F	1-25%	circ	CENTER	PILED
CV1027	2	NA	1-7	TP3	HRM	F	12	12	0	70	T	NR	11-20CM	MIXED	F1	NR	A	A	ROOT	NR	NR	F	1-25%	circ	CENTER	PILED
CV1027	3	NA	1-2	TP4	basin w/ rock	T	1	2	0	15	T	NR	5-10CM	ANG	NONE	NR	NR	NR	mixed n&c	NR	VISIBLE	F	1-25%	circ	EAST HALF	BASIN
CV1027	4	NA	1-4	TP5	HRC	T	10	10	0	40	T	NR	5-10CM	NR	NONE	NR	NR	NR	mixed n&c	NR	NR	F	1-25%	circ	CENTER	amorph
CV1038						F	0	0	0	0	F											F				
CV1038	1	NA	N/A	BT1	HRM	T	25	60	0	35	T	NR	NR	NR	NRC	NR	NR	NR	mixed n&c	NR	NR	F	1-25%	CRESC	UNK	PILED
CV1038	2	NA	NA	BT2	HRC	T	15	25	0	0	T	NR	NR	NR	NONE	NR	NR	NR	mixed n&c	NR	NR	F	1-25%	LINEAR	UNK	PILED
CV1038	3	NA	4-6	TP1,BT6	basin w/ rock	F	1.25	1.25	31	54	F	NR	11-20CM	SLAB	NONE	NR	NR	NR	ROOT	NR	NR	F	76-99%	ovate	ALL	BASIN
CV1038	4	NA	18-20	TP2,BT7	basin w/ rock	F	0.66	0.76	176	198	F	NR	11-20CM	SUB	NONE	NR	NR	NR	none	NR	VISIBLE	F	76-99%	ovate	ALL	BASIN
CV1038	5	NA	8-9	TP3,BT	BRC	F	0	0	73	82	F	2 Tiers	5-10CM	SUB	NONE	NR	NR	NR	ROOT	NR	INDET	F	1-25%	LINEAR	ALL	PILED
CV1038	6	NA	19-20	TP3,BT2	basin w/ rock	F	1	1	182	193	T	3 Tiers	11-20CM	SLAB	F2?	NR	NR	NR	ERODED	RESEN	VISIBLE	F	76-99%	ovate	CENTER	BASIN
CV1085						F	0	0	0	0	F											F				
CV1085	1	ND	4-5	TP1	basin no rock	F	1.1	1.3	32	50	T	N/A	N/A	N/A	NONE	A	P	P	MULTI BIO	N/A	VISIBLE	F	26-50%	circ	NE	BASIN
CV1097						F	0	0	0	0	F											F				
CV1098						F	0	0	0	0	F											F				
CV1098	1	NA	4	TP3	BRC	F	1	1	30	35	T	NR	<5CM	NR	NRC	NR	NR	NR	mixed n&c	NR	NR	F	1-25%	circ	SE	NR
CV1099						F	0	0	0	0	F											F				
CV1105						F	0	0	0	0	F											F				
CV1105	1	NA	11-12	TP1	basin w/ rock	F	1.2	1.2	110	117	T	NR	11-20CM	ANG	NRC	NR	NR	NR	mixed n&c	NR	VISIBLE	F	1-25%	circ	SE	BASIN
CV1105	2	NA	NA	BT1	hearth ang rock	F	0	0.28	140	150	T	NR	5-10CM	NR	NRC	NR	NR	NR	none	NR	NR	F	NT	Amorp	NONE	amorph
CV1105	3	NA	17-19	TP2&5,BT1	BRC	F	0	0	167	185	T	NR	5-10CM	SUB	NRC	NR	NR	NR	multi nat	NR	NR	F	1-25%	LINEAR	UNK	PILED
CV1105	4	NA	7-8	TP4,BT3	basin w/ rock	F	0.3	0.4	68	78	F	NR	11-20CM	NR	NRC	NR	NR	NR	none	NR	NR	F	1-25%	circ	ALL	UNK
CV1116						F	0	0	0	0	F											F				
CV1136						F	0	0	0	0	F											F				
CV1136	1	NA	2-6	TP2	BRC	F	0	0	18	54	T	NR	5-10CM	ANG	NONE	NR	NR	NR	ROOT	NR	POSS	F	1-25%	LINEAR	WEST	PILED
CV1136	2	NA	5-9	TP3	HRM	F	0	0	40	82	T	NR	5-10CM	ANG	NONE	NR	NR	NR	multi nat	NR	NR	F	1-25%	Amorp	UNK	PILED
CV1136	3	NA	12-13	TP1	BRP	F	0.9	1.1	118	130	F	NR	5-10CM	ANG	NONE	NR	A	A	none	NR	POSS	F	76-99%	Amorp	ALL?	UNK
CV1136	4	NA	1-5	TP6	BRC	F	0	0	7	50	T	NR	NR	NR	NONE	NR	NR	NR	ROOT	NR	POSS	F	1-25%	Amorp	UNK	PILED
CV1136	5	NA	8-9	TP5	basin slab lined	F	0.51	0.55	73	86	T	2 Tiers	NR	SLAB	NONE	A	A	A	ERODED	NR	POSS	F	1-25%	circ	NW	BASIN
CV1136	6	NA	13-14	TP5	hearth ang rock	F	0.49	0.54	121	133	T	1 Tier	5-10CM	SUB	NONE	NR	NR	P	ERODED	NR	POSS	F	1-25%	circ	NW	FLAT
CV1136	7	NA	NA	TP1,BT4	BRC	T	15	20	0	0	T	NR	NR	NR	NONE	NR	NR	NR	mixed n&c	NR	NR	F	26-50%	unk	UNK	UNK
CV1167						F	0	0	0	0	F											F				
CV1167	1	NA	3-6	TP1	HRM	T	50	50	20	55	T	NR	NR	NR	NONE	NR	NR	NR	V	NR	NR	T	1-25%	circ	UNK	PILED
CV1167	2	NA	4-5	TP1	POST MOLD	F	0.1	0.2	32	52	F	N/A	N/A	N/A	in F1	NR	NR	NR	none	N/A	POSS	F	100%	circ	ALL	NR
CV1200						F	0	0	0	0	F											F				
CV1200	1	NA	5-7	TP1	HRC	F	0	0	45	68	T	NR	5-10CM	NR	NONE	NR	NR	NR	ROOT	RESEN	POSS	F	1-25%	Amorp	UNK	FLAT
CV1200	2	NA	13-18	TP2	basin w/ rock	F	1.3	1.5	128	174	T	5 Tiers	11-20CM	SLAB	NONE	NR	P	P	ROOT	NR	VISIBLE	F	76-99%	circ	CENTER	PILED,BASIN
CV1200	3	NA	19-24	TP2	hearth,lit no rock	F	1.2	1.5	185	240	T	NR	N/A	NR	NONE	P	P	P	RODENT	NR	VISIBLE	F	51-75%	circ	WEST	amorph
CV137						F	0	0	0	0	F											F				
CV137	1	NA	1-12	TP1-2,BT1	HRM	T	50	50	0	120	T	NR	NR	NR	F2	NR	NR	NR	V	NR	NR	F	1-25%	unk	EAST	PILED
CV137	2	NA	4	TP1	V	F	0	0	31	36	F											F				
CV137	3	NA	13-15	TP2,BT1	BRM	F	0	0	122	147	T	NR	11-20CM	NR	NONE	A	A	A	ROOT	NR	NR	F	26-50%	Amorp	UNK	PILED
CV1391						F	0	0	0	0	F											F				
CV1391	1	NA	1-4	TP2	BRM	T	0	0	0	40	T	M-NC	NR	NR	F2,F1A	NR	NR	NR	MULTI BIO	NR	NR	F	1-25%	circ	UNK	PILED
CV1391	1A	NA	1-4	TP4	BRM	F	0	0	0	40	T	NR	NR	NR	F1,F2	NR	NR	NR	mixed n&c	NR	NR	F	1-25%	Amorp	UNK	UNK
CV1391	2	NA	3-6	TP2	basin slab lined	F	0	0	30	53	T	NR	NR	SLAB	F1,1A	NR	P	P	MULTI BIO	NR	VISIBLE	F	1-25%	ovate	UNK	BASIN
CV1391	3	NA	10-11	TP6	BRC	F	1	0.8	99	106	T	NR	NR	NR	NONE	NR	NR	NR	ROOT	NR	NR	F	1-25%	Amorp	UNK	NR
CV1400						F	0	0	0	0	F											F				
CV1400	1	NA			BRC	T	0	0	0	0	T	NR	NR	NR	NO RECO	NR	NR	NR	UNKNOWN	NR	NR	F	NT	unk	NO RECOR	UNK
CV1400	2	NA			BRS	T	0	0	0	0	T	NR	NR	NR	UNK	NR	NR	NR	UNKNOWN	NR	NR	F	NKNOW	unk	NO RECOR	UNK
CV1400	3	NA			historic	T	0	0	0	0	T	NR	NR	NR	NR	NR	NR	NR	UNKNOWN	NR	NR	F	NT	unk	UNK	UNK
CV1423						F	0	0	0	0	F											F				
CV1423	1	NA	1-3	TP6	DBM	T	14	14	0	26	T	NR	NR	NR	NONE	NR	NR	NR	ROOT	NR	NR	F	1-25%	circ	UNK	PILED
CV1423	2	NA			HRC	F	0	2	0	0	T	NR	NR	NR	UNK	NR	NR	NR	UNKNOWN	NR	NR	F	NKNOW	unk	UNK	UNK
CV1423	3	NA			BRC	F	0	7	0	0	T	NR	NR	NR	UNK	NR	NR	NR	UNKNOWN	NR	NR	F	NT	unk	UNK	UNK
CV1423	4	NA			BRC	F	0	7	0	0	T	NR	NR	NR	UNK	NR	NR	NR	UNKNOWN	NR	NR	F	NT	unk	NONE	UNK
CV1423	5	NA			BRS	F	0	0.6	0	0	T	NR	NR	NR	UNK	NR	NR	NR	UNKNOWN	NR	NR	F	NT	unk	NONE	UNK
CV1423	6	NA			HRC	F	0	1.5	0	0	T	NR	NR	NR	F7,8	NR	NR	NR	ERODED	NR	NR	F		unk	UNK	UNK
CV1423	7	NA			HRC	F	0	1.5	0	0	T	NR	NR	NR	F6,8	NR	NR	NR	ERODED	NR	NR	F	NKNOW	unk	UNK	UNK
CV1423	8	NA				F	0	0	0	0	F											F				
CV1423	9	NA	3-6	TP3,TP7	BRC	F	1	1	20	57	T	NR	11-20CM	NR	NONE	NR	NR	A	multi nat	NR	INDET	F	1-25%	Amorp	UNK	UNK
CV164						F	0	0	0	0	F											F				
CV174						F	0	0	0	0	F											F				
CV174	1	NA	1-10	TP5,BT2	BRM	T	50	110	0	95	T	NR	NR	NR	NONE	NR	NR	NR	V	NR	POSS	F	1-25%	circ	UNK	PILED
CV174	10	NA	9-10	TP7	basin w/ rock	F	1	1	88	95	T	1 Tier	5-10CM	SUB	F6	NR	NR	NR	ROOT	NR	POSS	F	26-50%	Amorp	EAST	BASIN
CV174	2	NA	14-15	BT1	basin w/ rock	F	0.52	1.04	135	150	T	NR	5-10CM	NR	NONE	NR	NR	NR	none	NR	NR	F	1-25%	circ	WEST	BASIN
CV174	3	NA	20-21	TP1,BT1	basin slab lined	F	1.2	1.7	194	209	T	3 Tiers	11-20CM	SLAB	NONE	NR	NR	NR	none	RESEN	VISIBLE	F	26-50%	circ	ORTH HAL	BASIN
CV174	4	NA	5-8	TP4,BT6	basin w/ rock	F	0.7	1.4	50	71	T	M-NC	5-10CM	ANG	NONE	NR	P	P	none	RESEN	VISIBLE	F	26-50%	circ	WEST HAL	BASIN
CV174	5	NA	13-15	TP2,BT4	basin slab lined	F	2	2	128	150	T	M-NC	5-10CM	SLAB	F8	NR	NR	NR	ROOT	NR	VISIBLE	F	26-50%	circ	SW	BASIN
CV174	6	NA	7-13	TP7,BT7	HRM	F	0	0	60	130	T	NR	11-20CM	NR	F10	NR	NR	NR	ROOT	NR	NR	F	1-25%	Amorp	UNK	PILED

Table B-1 Concluded.

SITE	FEA. ID	ROCK SHELTER	LEVELS	UNIT	TYPE	VIS ON SURF	TW (M)	TL (M)	TOP DEP (CM)	BTM DEP (CM)	SIZE EST.	ROCK TIERS	ROCK SIZE	ROCK SHAPE	REL. FEA.	ASH CHARC PRES.	BURN EARTH	DISCOLOR	DISTURB	ITU CR	INT STRUCT	NEST. FEAT	% EXCAV	PLAN SHAPE	PORT EXCAV	PROFILE SHAPE
CV174	7	NA	14-15	TP1,BT1	basin slab lined	F	1.04	0.92	135	147	T	NR	11-20CM	NR	NRC	NR	NR	NR	ROOT	NR	NR	F	26-50%	ovate	WEST	NR
CV174	8	NA	15-18	TP2,BT4	basin slab lined	F	2	2	152	175	T	M-NC	11-20CM	SLAB	F5	NR	NR	NR	ROOT	NR	VISIBLE	F	51-75%	circ	SOUTH	BASIN
CV174	9	NA	6-8	TP6,BT6	BRC	F	0	0	50	80	T	2 Tiers	5-10CM	ANG	NONE	NR	NR	NR	none	NR	NR	F	1-25%	Amorp	UNK	PILED
CV319						F	0	0	0	0	F											F				
CV319	1	NA	1-11	TP2-4	BRM	T	12	16	0	110	T	NR	5-10CM	NR	NONR	NR	NR	NR	multi cult	NR	POSS	F	1-25%	circ	CENTER	PILED
CV319	2	NA	1-2	TP1	BRC	F	0	4	0	20	T	NR	NR	NR	NONE	NR	NR	NR	multi cult	NR	NR	F	1-25%	circ	CENTER	NR
CV587						F	0	0	0	0	F											F				
CV587	1	NA	1-13	TP1,TP4	BRM	F	0	0	0	130	T	NR	NR	NR	NONE	NR	NR	NR	multi nat	NR	NR	F	1-25%	unk	NO RECOR	UNK
CV587	2	NA	1-4	TP3,BT2	basin w/ rock	F	0.5	2	5	36	T	NR	5-10CM	NR	NONE	NR	NR	NR	multi cult	NR	NR	F	1-25%	circ	NW	BASIN
CV595						F	0	0	0	0	F											F				
CV595	1	NA	2-10	TP1,BT1	BRM	F	10	20	10	110	T	NR	5-10CM	NR	NONE	NR	NR	NR	multi cult	NR	NR	F	1-25%	circ	CENTER	PILED
CV595	2	NA	1-7	TP2-3,BT2	BRM	T	15	22	0	70	T	NR	5-10CM	NR	NONE	NR	NR	NR	mixed n&c	NR	NR	F	1-25%	unk	UNK	PILED
CV95						F	0	0	0	0	F											F				
CV95	1	NA		BT1, TP1	BRC	T	15	15	0	0	T	NR	NR	NR	NONE	NR	NR	NR	ERODED	NR	NR	F	NT	circ	OT APPLI	UNK
CV95	10	NA	10-11	TP3,TP6	slab lined hearth	F	0.5	1	98	110	T	NR	11-20CM	NR	F8	A	A	A	ROOT	NR	NR	F	76-99%	LINEAR	ALL?	FLAT
CV95	2	NA		BT2	BRC	T	20	20	0	0	T	NR	NR	NR	NONE	NR	NR	NR	ERODED	NR	NR	F	NT	circ	OT APPLI	UNK
CV95	3	NA	7	TP5,BT6	hearth ang rock	F	0.3	0.5	60	65	T	NR	11-20CM	ANG	NRC	NR	NR	NR	ROOT	NR	NR	F	1-25%	circ	NW	FLAT
CV95	4	NA	6-10	TP4,BT5	hearth ang rock	T	88	85	59	93	T	3 Tiers	5-10CM	SUB	NONE	A	A	A	ROOT	NR	VISIBLE	F	100%	circ	ALL	PILED,BASIN
CV95	5	NA	5-7	TP1,BT1	basin w/ rock	F	0.4	0.68	49	69	F	NR	5-10CM	NR	N	NR	NR	NR	ROOT	NR	VISIBLE	F	100%	Amorp	WESTERN	BASIN
CV95	6	NA	10	TP5,	BRC	T	0	0	91	97	F	NR	5-10CM	SUB	F7	NR	NR	NR	MULTI BIO	NR	POSS	F	100%	Amorp	INDET	PILED
CV95	7	NA	11-12	TP5	hearth ang rock	F	0.4	0.42	109	117	F	NR	5-10CM	TAB	F6	NR	NR	NR	ROOT	NR	POSS	F	100%	circ	WESTERN	PILED,BASIN
CV95	8	NA	3-7	TP2	BRM	F	0	0	20	66	T	NR	5-10CM	MIXED	NONE	NR	NR	NR	multi nat	NR	NR	F	26-50%	Amorp	CENTER	FLAT
CV95	9	NA	14-16	TP5	BRC	F	0.6	1	139	155	F	NR	11-20CM	NR	NONE	A	A	A	multi nat	NR	NR	F	76-99%	SEMIcirc	ALL?	FLAT
CV960						F	0	0	0	0	F											F				
CV960	1	NA	6-7	TP1	hearth ang rock	F	1	1	59	69	T	NR	5-10CM	NR	NONE	NR	NR	NR	none	NR	POSS	F	1-25%	circ	NE	NR
CV960	2	NA	8-10	BT1	basin w/ rock	F	1	1	78	96	T	NR	5-10CM	NR	base f3	NR	NR	NR	MULTI BIO	NR	POSS	F	1-25%	circ	SW	BASIN
CV960	3	NA	1-7	TP4,BT1	BRM	T	20	35	0	68	T	NR	NR	NR	atop F2	NR	NR	NR	mixed n&c	NR	NR	F	1-25%	Amorp	UNK	PILED
CV960	4	NA	1-6	TP2	BRM	T	10	35	0	60	T	NR	<5CM	ANG	NRC	NR	NR	NR	mixed n&c	NR	NR	F	1-25%	Amorp	UNK	amorph
CV97						F	0	0	0	0	F											F				
CV97	1	NA	3-6	TP5	BRM	F	0	0	20	52	T	NR	<5CM	ANG	none	NR	NR	NR	multi nat	NR	NR	F	1-25%	Amorp	UNK	amorph
CV97	10	NA	15	6	dispersed hearth	F	0.7	0.8	143	147	F	1 Tier	5-10CM	NR	NONE	A	P	P	RODENT	NR	POSS	F	100%	Amorp	UNK	UNK
CV97	11	NA	10-11	TP11,BT16	hearth ang rock	F	0.66	0.42	91	104	T	NR	<5CM	SUB	NONE	NR	A	NR	none	NR	NR	F	26-50%	ovate	EAST HALF	BASIN
CV97	12	NA	7-10	TP13,BT12	basin w/ rock	F	1	1	66	91	T	NR	5-10CM	NR	NONE	NR	NR	NR	ROOT	NR	NR	F	26-50%	circ	EAST HALF	NR
CV97	13	NA	25-26	TP9	hearth ang rock	F	0	0	245	252	T	NR	5-10CM	NR	NONE	P	P	NR	ROOT	NR	NR	F	76-99%	circ	WEST	NR
CV97	14	NA	26-28	TP10	BRC	F	0	0	258	272	T	2 Tiers	5-10CM	NR	POSS. F15	NR	NR	NR	none	NR	NR	F	1-25%	unk		NR
CV97	15	NA	27-29	TP10,BT17	basin w/ rock	F	0	0	263	282	T	2 Tiers	NR	ANG	F14	NR	NR	P	UNKNOWN	NR	NR	F	26-50%	Amorp	WEST	UNK
CV97	16	NA	31-32	TP9,BT14	basin no rock	F	1.5	1.5	300	317	T	NR	5-10CM	ANG	NONE	P	P	P	MULTI BIO	NR	NR	F	76-99%	Amorp	CENTER	NR
CV97	17	NA	31-32	TP9,BT14	basin no rock	F	0.5	1	306	318	T	NR	5-10CM	ANG	F16	P	P	P	ROOT	N/A	VISIBLE	F	26-50%	circ	WEST HAL	BASIN
CV97	18	NA	31-32	TP10	natural	F	0	0	305	315	F											F				
CV97	19	NA	31-32	TP10,BT17	basin slab lined	F	0	0	305	315	T		11-20CM	NR	NONE	P	P	P	MULTI BIO	NR	POSS	F	26-50%	ovate	EAST	BASIN
CV97	2	NA	1-23	TP4	BRM	T	5	5	0	230	T	M-NC	5-10CM	NR	2A,2B,2C	P	A	P	V	NR	POSS	T	1-25%	Amorp	CENTER	FLAT
CV97	2A	NA	4-6	TP4,BT4	ash&char stains	F	1	1.5	38	60	T	N/A	N/A	N/A	F2,F2B	P	A	A	MULTI BIO	N/A	NR	T	1-25%	circ	SE	FLAT
CV97	2B	NA	11-12	TP4,BT4	BRP	F	0	0	100	117	T	3 Tiers	11-20CM	NR	F2,2A,2C	NR	NR	NR	none	NR	VISIBLE	T	1-25%	Amorp	NORTH 1/4	PILED
CV97	2C	NA	13-17	TP4,BT4	B rock&shell mid	F	0	0	128	170	T	NR	11-20CM	NR	F2,2A,2B	NR	NR	NR	ROOT	NR	NR	T	1-25%	Amorp	INDET	NR
CV97	3	NA	9-14	TP1	BRM	F	0	0	82	135	T	NR	5-10CM	NR	NONE	NR	NR	NR	ROOT	NR	NR	F	1-25%	unk	NE	NR
CV97	3A	NA	12	TP1	BRP	F	0	0	110	115	T	NR	NR	NR	3,3B	NR	NR	NR	ROOT	NR	NR	T	1-25%	unk	UNK	FLAT
CV97	3B	NA	13-14	TP1	BRP	F	0	0	122	133	T	1 Tier	NR	NR	3,3A	NR	NR	NR	UNKNOWN	NR	NR	T	1-25%	unk	UNK	FLAT
CV97	4	NA	23	TP3	h-no rock	F	1	1.2	226	230	T	N/A	N/A	N/A	NONE	P	P	P	none	N/A	NR	F	26-50%	ovate	EASTERN	BASIN
CV97	5	NA	24-25	TP3	basin no rock	F	0.65	0.64	235	242	T	N/A	N/A	N/A	NONE	P	P	P	none	N/A	POSS	F	100%	Amorp	ALL	BASIN
CV97	6	NA	3-4	TP8,BT9	BRC	F	0	0	22	38	T	3 Tiers	5-10CM	ANG	NONE	NR	NR	NR	none	NR	NR	F	1-25%	Amorp	NW	NR
CV97	7	NA	5-6	TP6,BT7	basin w/ rock	F	0	0	45	53	T	2 Tiers	5-10CM	ANG	NONE	NR	NR	NR	ROOT	RESEN	POSS	F	1-25%	Amorp	NE	PILED
CV97	8	NA	7-8	TP8	BRC	F	0	0	68	76	T	1 Tier	5-10CM	ANG	NONE	NR	NR	NR	none	NR	NR	F	1-25%	Amorp	UNK	FLAT
CV97	9	NA	13-15	TP7,BT7	hearth ang rock	F	0	0	128	147	T	1 Tier	5-10CM	TAB	NONE	NR	NR	NR	none	NR	NR	F	1-25%	Amorp	UNK	FLAT

APPENDIX C

ARTIFACT DATA

(Microfiche)

INTRODUCTION

This appendix contains 613 pages of primary artifact data presented on micro-fiche (see pocket on back cover). The four fiche cards contain a series of seven databases. The first database (71 pages) cross-tabulates overall artifact frequency by provenience and by artifact/sample class. The next six databases give detailed artifact data by class and catalog number for ceramics (1 page), projectile points (7 pages), lithic tools (46 pages), faunal material (81 pages), other materials (103 pages), and lithic debitage (304 pages). Within each of these six data bases, each line is a separate catalog entry. For all databases, data are presented in ascending alpha-numeric order, sorted by trinomial site number (all are prefaced by "41"), test pit, backhoe trench, and depth (10 cm level below surface). All measurements are metric.

KEY TO DATA CODES

Class: Ceramics. The 15 attributes recorded for ceramics are (left to right): site number, class, catalog number, test pit, backhoe trench, level, vessel form, sherd form, firing atmosphere, sherd thickness (mm), interior Munsell color, exterior Munsell color, core Munsell color, surface treatment, and count of specimens per catalog number.

Class: Projectile Points. The 25 attributes recorded for projectile points are (left to right): site number, catalog number, test pit, backhoe trench, level, point type, completeness, lithic material, breakage, reworking, flaking pattern, cross section, serration, basal thinning, basal grinding, shape, maximum length (mm), maximum width (mm), maximum thickness (mm), blade length (mm), blade width (mm), stem length (mm), stem width (mm), neck width (mm), and count of specimens per catalog number. Data codes for non-self explanatory attributes include the following:

Completeness	Comp = Complete Bl = Blade only St = Stem only Bl & St = Blade and stem LongSeg = Longitudinal segment Barb = Barb M = Medial fragment
Material	lithic material as described in Appendix I
Breakage	N = None P = Perverse Es = End-shock Imp = Impact O = Other Bu = Burinated Ind = Indeterminate
Flaking	M = Minimal P = Parallel R = Random AB = Alternately Beveled O = Other Indet = Indeterminate

Cross-section

D = Diamond
Bv= Beveled
PC = Plano-convex
Ind = Indeterminate
W = Wedge-shaped
BC = Bi-convex

Serration (SERR), *Basal Thining* (BTH), and *Basal Grinding* (BGR) are shown in one column, separated by commas. For each attribute, T = True and F = False

Shape

Six separate portions of the artifact are described in this column, with each data code separated by a space.

1. Blade Shape

T = Triangular
O = Ovate
L = Lancolate
P = Parallel
Unk = Unknown

2. Stem Shape

Exp = Expanding
Str = Straight
Cont = Contracting
N = None
In = Indeterminate
Bu = Bulbar

3. Base Shape

Str = Straight
Cv = Convex
Cc = Concave
P = Pointed
I = Indented
N = Notched
0 = Other
In = Indeterminate

4. Shoulder Shape

Sl = Sloping
R = Rounded
Ab = Abrupt
B = Barbed
EB = Extremely Barbed
IND = Indeterminate
N/A = Not applicable

5. Notch Shape

B = Basal
Bs = Basal & side
Bc = Basal & corner
S = Side
Cr = Corner
N = None
In = Indeterminate

6. Tang Shape

R = Rounded
P = Pointed
S = Square
In = Indeterminate
UNK = Unknown

Maximum (MX) *Metrics* are shown in one column, with length (L), width (W), and thickness (TH) given (mm) and separated by commas.

Blade (BL) *Metrics* are shown in one column, with length (L), and width (W) given (mm) and separated by commas.

Stem Metrics are shown in one column, with length (L), width (W), and thickness (TH) given (mm) and separated by commas.

Class: Lithic Tools. The 14 attributes recorded for non-debitage lithics are (left to right): site number, class, catalog number, test pit, backhoe trench, level, artifact type, completeness, lithic material, amount of cortex, cortex type, maximum length (mm), maximum width (mm), maximum thickness (mm), and working edge length (mm). Each record represents a single specimen. Length, width and thickness are given in a single column, separated by commas. For Working Edge, up to three measurements are given if multiple edges are present.

Class: Faunal Material. The 14 attributes recorded for faunal material are (left to right): site number, class, catalog number, test pit, backhoe trench, level, taxon, element, laterality (side), weathering, breakage, burning, cutmarks, and count of specimens per catalog number.

Class: Other Material. This category includes charcoal samples, light fraction flotation samples, macrobotanical samples, and snail shell samples. The 11 attributes recorded for other materials are (left to right): site number, class, catalog number, test pit, backhoe trench, level, carbonization, plant taxon, common plant name, plant part, and weight (gm).

Class: Lithic Debitage. This category includes both lithic debitage (larger than 1/4-inch) and lithic microdebitage (smaller than 1/4-inch). The 7 attributes recorded for all lithic debitage are (left to right): site number, class, catalog number, test pit, backhoe trench, level, lithic material, and count of specimens per catalog number. For macro-debitage (larger than 1/4-inch), 5 additional attributes are lithic material, size category, amount of cortex, type of cortex, and total weight (gm) per catalog number.

APPENDIX D

SUMMARY OF CHRONOMETRIC DATA

Table D-1 Radiocarbon Ages.

Site	Provenience	Material	Lab Number	Result (corrected)	Δ13C	Context
BL154	TP2,Level 19	sediment	Beta-75266	5740 +\ 60	-24.5	Fort Hood alluvial fill
BL154	TP2, Level 21	charcoal/soil	Beta-72487	6100 +\ 60	-25.4	Fort Hood alluvial fill
BL154	TP2,Level 25	charcoal/soil	Beta-72188	8600 +\ 50	-25.7	Fea 2-Georgetown fill
BL154	TP3, Level 6	charcoal/soil	Beta-75267	1680 +\ 60	-25.2	Base of Fea 1
BL198	TP1, Level 8	charcoal	Beta-72969	390 +\ 60	-26.6	Fea 1
BL339	BT5, 300 cmbs	charcoal/soil	Beta-74346	1460 +\ 60	-26.5	Fea 1
BL339	TP4, Level 18	charcoal	Beta-74347	1270 +\ 120	-28	Fea 4a
BL433	TP1, Level 3	charcoal	Beta-75167	1130 +\ 170	-27.5	shelter fill
BL532	TP6, Level 8	snail shell	Beta-78133	3580 +\ 60	-7.4	CB-432
BL532	TP3, Level 3	snail shell	Beta-78134	3720 +\ 50	-9.6	CB-454
BL532	TP4, Level 4	snail shell	Beta-78137	4670 +\ 60	-8.7	CB-429
BL564	TP2, Level 8	charcoal	Beta-73900	200 +\ 60	-24.7	Fea 1
BL564	TP2, Level 9	charcoal	Beta-73901	690 +\ 50	-25.6	Fea 1
BL567	TP2, Level 2	charcoal	Beta-74069	790 +\ 50	-25.96	Shelter Fill
BL740	TP5, Level 5	charcoal	Beta-74070	110 +\ 60	-25.5	Fea 2
BL743	TP1, Level 2	charcoal	Beta-64253	1030 +\ 70	-26	Fea 1
BL743	TP1, Level 4	charcoal	Beta-64254	3200 +\ 110	-26.2	Fea 1
BL743	TP1, Level 5-6	charcoal	Beta-64255	640 +\ 60	-26.1	Fea 1
BL754	TP2, Level 4	snail shell	Beta-78136	820 +\ 60	-10.1	CB-506
BL755	BT1, 150 cmbs	charcoal/soil	Beta-74414	2470 +\ 50	-25.3	above PS2
BL755	TP2, Level 5	charcoal	Beta-75168	1580 +\ 90	-26.7	Fea 1
BL755	TP2, Level 16	charcoal	Beta-75169	2460 +\ 60	-26.1	Above PS2
BL755	TP4, Level 19	snail shell	Beta-78135	7250 +\ 50	-9.4	CB-547
BL821	TP2, Level 7	charcoal	Beta-75170	1220 +\ 70	-27.5	Fea 1
BL886	TP6, Level 3	charcoal	Beta-75171	120 +\ 70	27.2	Shelter Fill
BL888	TP4, Level 3	charcoal	TX-8191	643 +\ 37	-26.1	Fea 2
CV95	TP5, Level 7	charcoal	Beta-75149	1410 +\ 60	-26.6	Fea 3
CV95	TP4, Level 8	charcoal	Beta-75150	1080 +\ 60	-26.6	Fea 4
CV0097	BT1, 190 cmbs	charcoal/soil	Beta-74068	1150 +\ 50	-26	Associated with a Pedernales point on
CV0097	TP1, Level 12	charcoal	Beta-75262	3090 +\ 100	-28.5	Fea 3a
CV0097	TP3, Level 23	charcoal	Beta-75154	690 +\ 70	-28.5	Fea 4
CV0097	TP6, Level 15	charcoal	Beta-75152	2890 +\ 60	-24.8	above F10
CV0097	TP7, Level 13	charcoal/soil	Beta-75151	2900 +\ 70	-25.6	Fea 9
CV0097	TP10, Level 31	charcoal/soil	TX-8189	2376 +\ 63	-24.9	Fea 18
CV0137	TP2, Level 15	charcoal	Beta-75155	3630 +\ 60	-25.4	Fea 3
CV0164	TP1, Level 5	charcoal/soil	Beta-73192	410 +\ 80	-26.4	Associated with
CV0174	BT5	charcoal/soil	Beta-70658	180 +\ 60	-27.4	adhering to ceramic
CV0174	TP1, Level 15	charcoal/soil	Beta-75156	1650 +\ 60	-26.3	Fea 7
CV0174	TP1, Level 21	charcoal/soil	TX-8192	1874 +\ 87	-26.3	Fea 3
CV0174	TP2, Level 14	charcoal/soil	Beta-75264	1910 +\ 60	-23.7	Fea 5
CV0174	TP4, Level 7	charcoal/soil	Beta-70659	510 +\ 50	-25.4	Fea 4
CV0174	TP7, Level 12-13	charcoal	Beta-75157	5240 +\ 50	-27.8	Fea 6
CV0319	TP3, Level 5	charcoal	Beta-71166	990 +\ 50	-25.8	Fea 1
CV0587	TP3, Level 3	charcoal	Beta-74467	260 +\ 70	-27.5	Fea 2
CV0595	TP1, Level 6	charcoal	Beta-70035	920 +\ 80	-25.1	Fea 1
CV0595	TP1, Level 3	charcoal/soil	Beta-70034	1240 +\ 70	-26.2	Fea 1
CV0595	TP3, Level 5	charcoal/soil	Beta-70033	1860 +\ 80	-26	Fea 2
CV0960	TP2, Level 8	charcoal	Beta-70037	1690 +\ 60	-27.2	under Fea 4
CV0960	TP2, Level 5	charcoal	Beta-70039	1730 +\ 60	-26.5	Fea 4
CV0960	TP4, Level 7	charcoal	Beta-70038	3200 +\ 60	-25.5	Fea 3
CV1007	TP1, Level 12	charcoal	Beta-75158	2470 +\ 60	-27.9	Fea 1

Table D-1 Concluded.

Site	Provenience	Material	Lab Number	Result (corrected)	Δ13C	Context
CV1011	TP1, Level 2	charcoal	Beta-74468	1740 +\ 60	-26.2	cultural zone in talus
CV1011	TP1, Level 6	charcoal	Beta-74469	2610 +\ 60	-26.3	cultural zone in talus
CV1027	TP1, Level 4	charcoal	Beta-64233	4200 +\ 80	-25.9	Fea 1
CV1027	TP1, Level 4	charcoal	Beta-64234	4370 +\ 70	-25.7	Fea 1
CV1027	TP1, Level 4	charcoal	Beta-64236	4360 +\ 80	-25.5	Fea 1
CV1027	TP1, Level 4	charcoal	Beta-64235	4490 +\ 60	-24.3	Fea 1
CV1038	TP1, Level 6	charcoal	TX-8190	361 +\ 34	-27	Fea 6
CV1038	TP3, Level 7	charcoal	Beta-75159	1140 +\ 60	-24.7	above Fea 5
CV1038	TP3, Level 19-20	charcoal	Beta-75160	3720 +\ 60	-25.3	Fea 6
CV1085	TP1, Level 3	charcoal	Beta-75161	380 +\ 70	-25.5	above Fea 1
CV1105	TP1, Level 28	charcoal/soil	Beta-70032	6280 +\ 60	-24.7	below Fea 1
CV1105	TP1, Level 49	charcoal/soil	Beta-70031	7190 +\ 90	-24.5	below Fea 1
CV1136	TP6, Level 4	charcoal	Beta-75162	1310 +\ 110	-27.1	Fea 4
CV1136	TP3, Level 8	charcoal	Beta-75163	1920 +\ 80	-26.1	Fea 2
CV1136	TP3, Level 18	charcoal	Beta-75164	2990 +\ 60	-25.6	below Fea 2
CV1167	TP1, Level 3	charred wood	Beta-79049	610 +\ 50	-26.5	burned post
CV1167	TP1, Level 4	charcoal/soil	Beta-75265	410 +\ 80	-27.6	Fea1
CV1200	TP2, Level 11	charcoal	Beta-70027	1240 +\ 60	-26	aboveFea2
CV1200	TP2, Level 7	charcoal	Beta-70030	740 +\ 60	-27	above Fea 2
CV1200	TP1, Level 21	snail shell	Beta-78132	1530 +\ 50	-10.3	West Range Fill
CV1200	TP2, Level 18	charcoal	Beta-70565	1260 +\ 60	-26.2	Fea 2
CV1391	TP2, Level 4	charcoal	TX-8188	1031 +\ 34	-27.1	Fea 1
CV1391	TP4, Level 3	charcoal	Beta-75165	1760 +\ 100	-28.8	Fea 1a

Table D-2 Chronometric Results Obtained by Amino Acid Epimerization of Land Snails.

Provenience	Sample No.	A/I Value	Radiocarbon-Equivalent Age (Years BP)			Comments	Interpreted Suite Age
41BL154	cb-373	0.0799	3,256	+/-	186		
TP3, 70-93 cm	cb-377	0.0809	3,302	+/-	189		
colluvium	cb-372	0.0820	3,354	+/-	191		
under midden	cb-374	0.1000	4,194	+/-	233	rejected	
	cb-371	0.1220	5,221	+/-	285	rejected	
	cb-375	0.1320	5,687	+/-	308	rejected	
	cb-376	0.1320	5,687	+/-	308	rejected	
	cb-370	0.2560	11,474	+/-	597	rejected	3300 BP
41BL198	cc-2	0.0754	3,046	+/-	176	rejected	
TP2, L3	cc-1	0.1530	6,667	+/-	357		
Fea 2 BRM	cc-6	0.1580	6,901	+/-	369		
	cc-4	0.1700	7,461	+/-	397		
	cc-5	0.3780	17,168	+/-	882	rejected	
	cc-3	1.1130	51,470	+/-	2,597	heated-rejected	7000 BP
41BL168	cc-12	0.0399	1,389	+/-	93		
TP2, L2	cc-7	0.0449	1,622	+/-	105		
Shelter E	cc-8	0.0530	2,000	+/-	124		
	cc-10	0.0667	2,640	+/-	156	rejected	
	cc-9	0.0723	2,901	+/-	169	rejected	
	cc-11	0.1560	6,807	+/-	364	redeposited-rejected	2500 BP
41BL198	cb-411	0.0140	180	+/-	33	modern intrusive?-rejected	
TP1, L5	cb-412	0.0143	194	+/-	33	modern intrusive?-rejected	
Fea 1 BRM	cb-409	0.0768	3,111	+/-	179		
	cb-413	0.0791	3,218	+/-	185		
	cb-408	0.0854	3,512	+/-	199		
	cb-410	0.0863	3,554	+/-	201		
	cb-414	0.1190	5,080	+/-	278	prob not heated-rejected	
	cb-407	0.1800	7,927	+/-	420	prob not heated-rejected	3300 BP
41BL470	cb-422	0.0611	2,378	+/-	143		
TP2, L12	cb-418	0.0727	2,920	+/-	170	rejected	
alluvium	cb-416	0.0798	3,251	+/-	186	rejected	
	cb-419	0.0943	3,928	+/-	220	rejected	
	cb-417	0.0974	4,072	+/-	227	rejected	
	cb-420	0.0982	4,110	+/-	229	rejected	
	cb-415	0.1010	4,240	+/-	236	rejected	
	cb-421	0.1350	5,827	+/-	315	rejected	2400 BP
41BL532	cb-430	0.1070	4,520	+/-	250		
TP4, L4	cb-429	0.1270	5,454	+/-	296	rejected	
colluvium	cb-423	0.1340	5,781	+/-	313	rejected	
	cb-425	0.1380	5,967	+/-	322	rejected	
	cb-426	0.1640	7,181	+/-	383	rejected	
	cb-427	0.1840	8,114	+/-	429	rejected	
	cb-428	0.1970	8,721	+/-	460	rejected	
	cb-424	0.9240	42,649	+/-	2,156	heated-rejected	4500 BP
41BL532	cb-434	0.0776	3,148	+/-	181	odd man out-rejected	
TP6, L8	cb-437	0.0945	3,937	+/-	221		
colluvium	cb-432	0.0983	4,114	+/-	229		

Table D-2 Continued.

Provenience	Sample No.	A/I Value	Radiocarbon-Equivalent Age (Years BP)	Comments	Interpreted Suite Age
	cb-433	0.1000	4,194 +/- 233		
	cb-439	0.1000	4,194 +/- 233		
	cb-431	0.1010	4,240 +/- 236		
	cb-435	0.1020	4,287 +/- 238		
	cb-436	0.1060	4,474 +/- 247		4200 BP
41BL532	cb-447	0.0413	1,454 +/- 96		
TP5, L 6	cb-445	0.0473	1,734 +/- 110		
colluvium	cb-440	0.0510	1,907 +/- 119		
	cb-446	0.0567	2,173 +/- 132	rejected	
	cb-444	0.0674	2,672 +/- 157	rejected	
	cb-442	0.0778	3,158 +/- 182	rejected	
	cb-441	0.0860	3,540 +/- 201	rejected	
	cb-443	0.2530	11,334 +/- 590	heated?-rejected	1700 BP
41BL532	cb-448	0.1190	5,080 +/- 278		
TP3, L3	cb-454	0.1190	5,080 +/- 278		
colluvium	cb-455	0.1320	5,687 +/- 308	rejected	
	cb-449	0.1340	5,781 +/- 313	rejected	
	cb-452	0.1660	7,274 +/- 387	rejected	
	cb-456	0.1680	7,367 +/- 392	rejected	
	cb-476	0.5620	25,755 +/- 1,311	rejected	
	cb-451	0.6790	31,215 +/- 1,584	rejected	5100 BP
41BL433	cb-481	0.0251	698 +/- 59	rejected	
TP2, L3	cb-479	0.0320	1,020 +/- 75		
shelter	cb-477	0.0569	2,182 +/- 133	rejected	
	cb-458	0.1040	4,380 +/- 243	rejected	
	cb-459	0.2170	9,654 +/- 506	rejected	
	cb-478	0.2280	10,167 +/- 532	rejected	
	cb-482	0.3020	13,621 +/- 705	rejected	
	cb-480	0.5540	25,382 +/- 1,293	rejected	1000 BP
41BL513	cb-484	0.0579	2,229 +/- 135		
TP1, L7	cb-485	0.0622	2,430 +/- 145		
terrace alluvium	cb-500	0.0648	2,551 +/- 151		
	cb-503	0.0654	2,579 +/- 153		
	cb-487	0.0665	2,630 +/- 155		
	cb-501	0.0702	2,803 +/- 164		
	cb-486	0.0716	2,868 +/- 167		
	cb-502	0.0775	3,144 +/- 181		2650 BP
41BL754	cb-506	0.0175	344 +/- 41		
TP2, L4	cb-507	0.0175	344 +/- 41		
shelter	cb-508	0.0178	358 +/- 42		
	cb-509	0.0187	400 +/- 44		
	cb-505	0.0211	512 +/- 49		
	cb-504	0.0235	624 +/- 55		
	cb-511	0.0312	983 +/- 73	rejected	
	cb-510	0.0342	1,123 +/- 80	rejected	
	cb-521	0.0462	1,683 +/- 108	rejected	
	cb-520	0.0490	1,814 +/- 114	rejected	

Table D-2 Continued.

Provenience	Sample No.	A/I Value	Radiocarbon-Equivalent Age (Years BP)			Comments	Interpreted Suite Age
	cb-523	0.0564	2,159	+/-	132	rejected	
	cb-522	0.1810	7,974	+/-	422	rejected	400 BP
41BL740	cb-512	0.0209	502	+/-	49		
TP2, L3	cb-514	0.0212	516	+/-	49		
midden	cb-513	0.0261	745	+/-	61	rejected	
	cb-519	0.0315	997	+/-	74	rejected	
	cb-516	0.0369	1,249	+/-	86	rejected	
	cb-518	0.0426	1,515	+/-	99	rejected	
	cb-517	0.0508	1,898	+/-	119	rejected	
	cb-515	0.4650	21,228	+/-	1,085	rejected	500 BP
41BL751	cb-534	0.0368	1,244	+/-	86		
TP1, L7	cb-532	0.0503	1,874	+/-	117		
midden	cb-533	0.0546	2,075	+/-	127		
	cb-530	0.0758	3,064	+/-	177	rejected	
	cb-531	0.0831	3,405	+/-	194	rejected	
	cb-535	0.1130	4,800	+/-	264	rejected	1700 BP
41BL888	cb-538	0.0452	1,636	+/-	105		
TP3, L10	cb-544	0.0459	1,669	+/-	107		
terrace alluvium	cb-541	0.0461	1,678	+/-	108		
midden	cb-539	0.0470	1,720	+/-	110		
	cb-536	0.0482	1,776	+/-	112		
	cb-545	0.0536	2,028	+/-	125		
	cb-540	0.0538	2,038	+/-	126		
	cb-542	0.0557	2,126	+/-	130		
	cb-537	0.0566	2,168	+/-	132		
	cb-543	0.0738	2,971	+/-	172	rejected	1900 BP
41BL755	cb-547	0.1020	4,287	+/-	238		
TP4, L19	cb-549	0.1050	4,427	+/-	245		
terrace alluvium	cb-546	0.1090	4,614	+/-	254		
(buried soil)	cb-550	0.1170	4,987	+/-	273	rejected	
	cb-548	0.1250	5,361	+/-	292	rejected	4400 BP
41CV1200	cb-156	0.0406	1,422	+/-	95		
TP2, L11	cb-154	0.0408	1,431	+/-	95		
	cb-171	0.0408	1,431	+/-	95		
	cb-157	0.0409	1,436	+/-	95		
	cb-158	0.0446	1,608	+/-	104	rejected	
	cb-155	0.0473	1,734	+/-	110	rejected	
	cb-160	0.0474	1,739	+/-	111	rejected	
	cb-172	0.0748	3,018	+/-	175	rejected	
	cb-159	0.1020	4,287	+/-	238	rejected	1400 BP
41CV1200	cb-169	0.0288	871	+/-	67	rejected	
TP1, L21	cb-161	0.0429	1,529	+/-	100		
	cb-166	0.0473	1,734	+/-	110		
	cb-167	0.0480	1,767	+/-	112		
	cb-168	0.0527	1,986	+/-	123	rejected	
	cb-164	0.0557	2,126	+/-	130	rejected	
	cb-165	0.0615	2,397	+/-	144	rejected	

Table D-2 Continued.

Provenience	Sample No.	A/I Value	Radiocarbon-Equivalent Age (Years BP)			Comments	Interpreted Suite Age
	cb-162	0.0638	2,504	+/-	149	rejected	
	cb-163	0.0748	3,018	+/-	175	rejected	1700 BP
41BL755	cb-726	0.0505	1,884	+/-	118		
TP2, L15 & 16	cb-729	0.0522	1,963	+/-	122		
	cb-728	0.0864	3,559	+/-	202	rejected	
	cb-727	0.1950	8,627	+/-	455	rejected	1900 BP
41BL888	cb-551	0.0261	745	+/-	61		
TP4, L8	cb-745	0.0283	848	+/-	66		
	cb-742	0.0322	1,030	+/-	75		
	cb-741	0.0324	1,039	+/-	76		
	cb-743	0.0340	1,114	+/-	79		
	cb-739	0.0351	1,165	+/-	82		
	cb-744	0.0380	1,300	+/-	89		
	cb-740	0.0389	1,342	+/-	91		
	cb-552	0.0447	1,613	+/-	104		
	cb-738	0.5890	27,015	+/-	1,374	rejected	1100 BP
41CV137	cb-652	0.0702	2,803	+/-	164		
TP2, L15	cb-650	0.0706	2,822	+/-	165		
	cb-655	0.0711	2,845	+/-	166		
	cb-654	0.0715	2,864	+/-	167		
	cb-648	0.0737	2,966	+/-	172		
	cb-653	0.0786	3,195	+/-	183		
	cb-649	0.0801	3,265	+/-	187		
	cb-651	0.1460	6,341	+/-	341	rejected	3000 BP
41CV1136	cb-660	0.1080	4,567	+/-	252		
TP1, L15	cb-663	0.1100	4,660	+/-	257		
	cb-664	0.1160	4,940	+/-	271		
	cb-656	0.1240	5,314	+/-	289		
	cb-658	0.1250	5,361	+/-	292		
	cb657	0.1490	6,481	+/-	348	rejected	
	cb-662	0.3880	17,635	+/-	905	rejected	
	cb-661	0.4020	18,288	+/-	938	rejected	5000 BP
41CV97	cb-671	0.1040	4,380	+/-	243		
TP11, L11	cb-666	0.1150	4,894	+/-	268		
	cb-670	0.1220	5,221	+/-	285		
	cb-667	0.1350	5,827	+/-	315		
	cb-715	0.1560	6,807	+/-	364		
	cb-668	0.1880	8,301	+/-	439		
	cb-669	0.1960	8,674	+/-	457		
	cb-665	0.4080	18,568	+/-	952	rejected	6300 BP
41BL765	cb-716	0.0344	1,132	+/-	80		
TP2, L2	cb-721	0.0390	1,347	+/-	91		
	cb-722	0.0411	1,445	+/-	96		
	cb-723	0.0416	1,468	+/-	97		
	cb-720	0.0429	1,529	+/-	100		
	cb-717	0.0461	1,678	+/-	108		
	cb-718	0.0464	1,692	+/-	108		

Table D-2 Concluded.

Provenience	Sample No.	A/I Value	Radiocarbon-Equivalent Age (Years BP)			Comments	Interpreted Suite Age
	cb-724	0.0560	2,140	+/-	131	rejected	
	cb-719	0.9440	43,583	+/-	2,203	rejected	1500 BP
41BL765	cb-747	0.0319	1,016	+/-	74		
TP2, L1	cb-754	0.0367	1,240	+/-	86		
	cb-755	0.0392	1,356	+/-	91		
	cb-756	0.0426	1,515	+/-	99		
	cb-746	0.0523	1,968	+/-	122	rejected	
	cb-759	0.0578	2,224	+/-	135	rejected	
	cb-749	0.0651	2,565	+/-	152	rejected	
	cb-748	0.1230	5,267	+/-	287	rejected	
	cb-757	0.1450	6,294	+/-	338	rejected	
	cb-758	0.6070	27,855	+/-	1,416	rejected	1300 BP
41BL821	cb-761	0.0339	1,109	+/-	79	rejected	
TP2, L18-19	cb-765	0.0822	3,363	+/-	192		
	cb-764	0.0827	3,386	+/-	193		
	cb-760	0.0957	3,993	+/-	223	rejected	
	cb-766	0.1050	4,427	+/-	245	rejected	
	cb-762	0.1240	5,314	+/-	289	rejected	
	cb-763	0.2840	12,781	+/-	663	rejected	
	cb-767	0.3490	15,814	+/-	814	rejected	3400 BP
41CV1200	CB-779	0.0266	768	+/-	62	rejected	
TP2, L7	CB-783	0.0293	894	+/-	68		
	CB-776	0.0310	974	+/-	72		
	CB-778	0.0310	974	+/-	72		
	CB-781	0.0310	974	+/-	72		
	CB-775	0.0319	1,016	+/-	74		
	CB-782	0.0331	1,072	+/-	77		
	CB-774	0.0368	1,244	+/-	86	rejected	
	CB-777	0.0607	2,360	+/-	142	rejected	1000 BP
41CV595	CB-790	0.0390	1,347	+/-	91		
TP1, L3	CB-788	0.0407	1,426	+/-	95		
	CB-784	0.0457	1,660	+/-	107	rejected	
	CB-787	0.0545	2,070	+/-	127	rejected	
	CB-786	0.0583	2,248	+/-	136	rejected	
	CB-789	0.1030	4,334	+/-	240	rejected	1400 BP
41CV595	CB-793	0.0351	1,165	+/-	82		
TP1, L6	CB-795	0.0427	1,520	+/-	100	rejected	
	CB-792	0.0481	1,772	+/-	112	rejected	
	CB-794	0.0623	2,434	+/-	145	rejected	
	CB-791	0.0723	2,901	+/-	169	rejected	1200 BP
41BL755	CB-796	0.1040	4,380	+/-	243		4400 BP
Re-analysis of CB547 modern	CB-797	0.0123	101	+/-	29		

Note: The error factor given below accounts for measurement error only (+/-5%).
Interpreted Age is a rounded value based on an average of unrejected specimens from each provenience.

APPENDIX E

PETROGRAPHIC ANALYSIS OF CERAMIC THIN SECTIONS

by

Kathryn Reese-Taylor

PETROGRAPHIC ANALYSIS OF CERAMIC THIN SECTIONS

INTRODUCTION

As a part of its ongoing cultural resources investigations at Fort Hood, Mariah Associates submitted eight ceramic sherds and three sand samples for petrographic analysis. The study had four objectives: 1) to identify the major constituents in the paste of each sherd; 2) to determine an accurate grain size distribution for each sample; 3) to define paste groups based upon both point count and grain size data; and 4) to compare the constituents identified within the groups with the three sand samples. Constituents suggest that most of the ceramics, seven out of eight, were recovered from a Toyah phase occupation, while one sample was of anomalous in origin.

The Toyah phase was a cultural horizon present in Texas from approximately A.D. 1300 through A.D. 1650. This cultural phenomena was characterized by a reliance on small scale buffalo hunting and intermittent maize cultivation (Prewitt 1981). The associated artifact assemblage which serves to distinguish the Toyah phase included large quantities of bison bone, end scrapers, beveled knives, arrowpoint types such as Perdiz, Clifton, and, at times, Fresno and Harrell, and undecorated ceramics with bone temper, identified as the ubiquitous Leon Plain (Creel 1990). This assemblage of artifacts was concentrated within the Central Texas region, but also extended to the southern Lower Plains, as indicated by the Lott site (Runckles and Dorchester 1986) and to the Central Texas Coast, as evinced by the Hinajosa site (Black 1986).

The geographic range of the Toyah culture (a term preferred to phase) may have been an indirect consequence of a drying trend that began in A.D. 800 to 1170. This drying trend affected the Prairie Margin causing the replacement of the forest to the east and south of the Southern Plains; first by tall grasses, then subsequently by medium and short grasses which are more drought resistant (Runkles and Dorchester 1986). The bison herds followed the emergence of the prairie grasses into their current geographic distribution, and the Toyah people followed the bison (Johnson 1994).

Little is known about the lifeways of the Toyah people (Creel 1990). It has been suggested that the Toyah people relied upon the bison as a primary subsistence source and, therefore, were nomadic (Johnson 1994); however, there have been few settlement pattern studies conducted to substantiate this. Lee Johnson, in his Buckhollow site report, has reexamined Toyah phase occupations in several different geographic locales (Johnson 1994) Based upon a comparison among these sites, Johnson has proposed that there was a distinction between the degree of mobility found in Toyah people of southern Central Texas and those of the Lower Plains. Initially Johnson stated,

> "Toyah people, as entire communities, did not move around the landscape for great distances" (Johnson 1994:471).

However, he later contended that Toyah communities on the South Plains and Rolling Plains, the northern periphery of the culture area, migrated over a wider range in search of large herds of bison (Johnson 1994:473).

If the Toyah communities on the northern periphery of the culture area did travel over greater distances, then it is logical to assume that they had access to a wider variety of natural resource. Exploitation of a variety of resources from several geographic locales would be reflected within the Toyah artifact assemblage.

One of the most sensitive indicators of resource utilization is the paste composition of ceramics (Shepard 1965, 1976; Rice 1987; Reese 1989; Reese-Taylor 1991, 1993a, 1993b, 1995a, in press; Reese-Taylor et al. 1994). Both the clay and the temper used to manufacture ceramics have elemental components which serve to distinguish between geologic resources. Therefore, a ceramic assemblage which demonstrates a high degree heterogeneity in the elemental constituents of clays and tempers would indicate utilization of a variety of geologic resources. Likewise,

a ceramic assemblage demonstrating a more homogenous array of elemental constituents would indicate a limited range of resources utilized.

METHODOLOGY

The sherds and sand samples were first submitted to Spectrum Petrographics of South Jordan, Utah, to have thin-section slides prepared. One sample per slide was mounted in an orientation that was parallel to the vessel wall. A blue epoxy resin was used for consolidation. The samples were then ground to the recommended thickness of 0.03 mm (Shepard 1976:139). Chemical staining (i.e., hydrofluoric and hydrochloric acid) for precise identification of alkaline feldspars and calcites was subsequently applied.

Analysis of the thin sections was conducted using a petrographic microscope at the Bureau of Economic Geology. The methodology applied was developed based on previous petrographic studies of ceramic thin sections. A brief description of the sampling methods and analytical techniques follows. For a complete description of petrographic methodology, see Shepard (1942, 1965, 1976), Folk (1968), Rice (1987), and Reese (1989).

Initially, a scan of the thin section was completed at an objective of 2.5x, and a description of the general characteristics of the clay matrix and the inclusions was recorded. Then, to quantify the data for quantitative comparisons, a point count was taken at an objective of 10x. This petrographic analysis did not attempt to identify rock fragments (other than recording them as volcanic, metamorphic, sedimentary, or carbonate) in the samples. This was done to avoid potential confusion and misidentification of various rocks because the mineral constituents of the fragments are so small that conclusive identifications are not possible.

The analysis was designed to count at least 200 points, a number determined to statistically represent all elements present in a sample (Rice 1987:382; Reese 1989:89). A three-stage interval for stage advancement was determined for each slide. This interval is slightly larger than the average grain size for each specimen and was selected to avoid counting inclusions more than once. Then a point count which completely covered the thin section was conducted. With a more-comprehensive point count, minor variations that otherwise might have been overlooked in a scan were noted.

Grain size was determined by measuring 20% of the nonplastic inclusions at their maximum width. Statistically, a sample size representing 20% of the population is significant and will overcome any possible biases in the range, mode, and mean of each specimen (Leonard 1976:153). The grain size count was conducted in a similar fashion. A five-stage interval was chosen to avoid measuring any grain twice. This allowed complete coverage of the thin section.

The general shapes of the inclusions in the samples are based upon categories of roundness and sphericity established by AMSTRAT, the American/Canadian Stratigraphic Association (Folk 1968). Grain size characteristics were identified based upon the range, distribution, mode, and mean of each sample in relationship to the Wentworth Size Scale (Table E-1). Each statistic represents an important piece of information concerning the grain sizes present in the samples. The range indicates the minimum and maximum size classification for the sample measured, the distribution shows the frequency of each size class, and the mode represents the most-common grain size class present.

Table E-1 Grain Size Scales for Sediments.

Millimeters	Wentworth Size Class	Macro Size Class
>256 mm	Boulder	Gravel
64-256 mm	Cobble	
4-64 mm	Pebble	
2-4 mm	Granule	
1-2 mm	Very Coarse Sand	Sand
0.5-1 mm	Coarse Sand	
0.25-0.5 mm	Medium Sand	
0.125-0.25 mm	Fine Sand	
0.0625-0.125 mm	Very Fine Sand	
0.031-0.0625 mm	Coarse Silt	Mud
0.0156-0.031 mm	Medium Silt	
0.0078-0.0156 mm	Fine Silt	
0.0039-0.0078 mm	Very Fine Silt	
<0.0039 mm	Clay	

DEFINITION OF SAND SAMPLES

The examination of three sand samples revealed the presence two major and two minor constituents (Table E-2). Quartz grains and sedimentary rock fragments (SRF) (with or without calcite) constitute 97% to 100% of the sand with small quantities of orthoclase feldspar (2%) present in samples 2 and 3, and also some organics (1%) present in sample 3.

The distance from the source is a measure of the maturity of both wind and water born sediments. Not all minerals dissolve at the same rate. The greater the distance traveled by the sediments, the greater the opportunity for easily dissolved minerals to be eliminated (Montgomery 1987:79). Climate also affects the alteration and breakdown of minerals. The more rainfall the more, the greater the chemical breakdown (Montgomery 1987:79). Quartz in all cases is resistant to dissolving and chemical breakdown. Minerals which decompose or are easily altered include ferromagnesians (hematite), carbonates, plagioclase feldspars, and othoclase feldspars, in order of time it takes the mineral to break down from least amount to longest.

All the sand samples are mature and mixed with a sedimentary, calcareous silt. Fossil fragments are present within the sedimentary silt of samples 1 and 2. The amount of sedimentary silt with calcite present, ranging from 5% and 93%, varies reciprocally among samples with the amount of sedimentary silt without calcite, ranging from 3% to 27%. This reciprocal relationship between constituents is also true of the ratio of quartz to all sedimentary silt. Quartz is present in samples 1,2, and 3 in frequencies of 4%, 19%, and 65% respectively, and sedimentary silt is present in frequencies of 96%, 79%, and 32% respectively.

Table E-2 Point Count and Grain Size Data for Sand Samples.

	Sand Samples		
Sample Number	1	2	3
Count	200	200	200
Clay	-	-	-
Pores	-	-	-
Non-Plastics	100.00%	100.00%	100.00%
Quartz	4.00%	19.00%	65.00%
Orthoclase Feldspar	-	2.00%	2.00%
Plagioclase Feldspar	-	-	-
Mica	-	-	-
Biotite	-	-	-
Calcite	-	-	-
Chert	-	-	-
Hematite	-	-	-
Bone	-	-	-
Grog	-	-	-
Organic	-	-	1.00%
Sedimentary Silt w/Calcite	93.00%	59.00%	5.00%
Sedimentary Silt w/o Calcite	3.00%	20.00%	27.00%
Distribution of Grain Sizes	-		
Fine Silt, 0.0078-0.0156	0.00%	30.00%	10.00%
Medium Silt, 0.0156-0.031	0.00%	30.00%	0.00%
Coarse Silt, 0.031-0.0625	0.00%	10.00%	30.00%
VF Sand, 0.0625-0.125	0.00%	10.00%	40.00%
Fine Sand, 0.125-0.25	10.00%	10.00%	10.00%
Medium Sand, 0.25-0.5	70.00%	10.00%	10.00%
Coarse Sand, 0.5-1.0	20.00%	0.00%	0.00%
Very Coarse Sand, 1.0-2.0	0.00%	0.00%	0.00%
Granule, 2-4	0.00%	0.00%	0.00%
mode	med sand	fine-med silt	VF sand
average	0.428 mm	0.080 mm	0.094 mm

The sand is well sorted in sample 1 (70% medium sand), but is poorly sorted in samples 2 and 3. The grains range in size from 0.015 mm (fine silt) to 0.6 mm (course sand). The means vary from 0.08 mm (very fine sand) to 0.42 mm (medium sand). The modes range from 0.015 mm (fine silt) to 0.5 mm (medium sand). The quartz grains are subangular and the sedimentary silt grains are subrounded.

DEFINITION OF PASTE GROUPS

The paste groups are defined based upon the frequency of the elements present and grain size characteristics (Table E-3). Initial classification is based on the presence of inclusions which are not naturally occurring in a clay matrix, such as bone or grog, in amounts equaling to or exceeding 10% of the non-plastic elements. This approach defined three paste groups within the ceramic sample. A discussion of the range of variation and the specific characteristics

Table E-3 Point Count and Grain Size Data for Paste Groups.

	Bone Tempered Pastes					Grog Tempered Pastes		Sandy Paste
Sample Number	1-174-061	1-174-284	1-174-203	1-1038-167	2-596-007	1-41-032	1-960-211	1-11169-013
Count	200	200	200	200	200	200	200	200
Clay	43.00%	63.00%	69.00%	64.00%	55.00%	75.00%	63.00%	59.00%
Pores	8.00%	6.00%	1.00%	6.00%	2.00%	1.00%	2.00%	11.00%
Non-Plastics	49.00%	31.01%	30.00%	30.01%	43.02%	24.02%	35.00%	30.00%
Quartz	42.86%	25.81%	23.33%	20.00%	37.21%	58.33%	74.29%	90.00%
Orthoclase Feldspar	-	3.23%	-	3.33%	4.65%	-	2.86%	-
Plagioclase Feldspar	-	-	-	-	1.00%	-	-	-
Mica	-	-	-	-	-	1.00%	-	-
Biotite	-	1.00%	-	-	2.33%	-	-	-
Calcite	-	12.90%	-	-	-	-	-	-
Chert	-	-	-	1.00%	1.00%	1.00%	-	-
Hematite	-	-	10.00%	16.67%	-	29.17%	-	10.00%
Bone	46.94%	38.71%	46.67%	53.33%	53.49%	-	-	-
Grog	-	-	-	-	-	12.50%	22.86%	-
Organic	-	-	-	-	-	-	-	-
Sedimentary Silt w/Calcite	10.20%	19.35%	20.00%	3.33%	-	-	-	-
Sedimentary Silt w/o Calcite	-	-	-	3.33%	2.33%	-	-	-
Distribution of Grain Sizes								
Fine Silt, 0.0078-0.0156	10.00%	0.00%	10.00%	10.00%	0.00%	10.00%	0.00%	0.00%
Medium Silt, 0.0156-0.031	0.00%	10.00%	20.00%	10.00%	0.00%	20.00%	20.00%	70.00%
Coarse Silt, 0.031-0.0625	20.00%	30.00%	10.00%	0.00%	0.00%	20.00%	20.00%	30.00%
VF Sand, 0.0625-0.125	20.00%	10.00%	0.00%	0.00%	10.00%	20.00%	50.00%	0.00%
Fine Sand, 0.125-0.25	10.00%	40.00%	20.00%	20.00%	30.00%	20.00%	0.00%	0.00%
Medium Sand, 0.25-0.5	10.00%	10.00%	10.00%	30.00%	20.00%	0.00%	0.00%	0.00%
Coarse Sand, 0.5-1.0	20.00%	0.00%	30.00%	30.00%	0.00%	10.00%	10.00%	0.00%
Very Coarse Sand, 1.0-2.0	10.00%	0.00%	0.00%	0.00%	20.00%	0.00%	0.00%	0.00%
Granule, 2-4	0.00%	0.00%	0.00%	0.00%	20.00%	0.00%	0.00%	0.00%
mode	crs silt VF sand	fine sand	coarse sand	med-crs sand	fine sand	med silt-fine sand	VF sand	med silt
average	0.415 mm	0.119 mm	0.300 mm	0.380 mm	1.042 mm	0.209 mm	0.119 mm	0.036 mm

of each ceramic is included within all paste group descriptions. Unless specifically stated all frequencies of the grains are based upon the percentage of inclusions in total non-plastics.

The presence of temper versus naturally occurring grains is based upon the examination of clay samples from several different sources. Generally, the non-plastic inclusions found naturally in clay bodies does not exceed 30% of the total clay matrix and a majority of the grains are smaller than 0.125 mm at their maximum width (Boyd and Reese-Taylor 1993; H. Neff personal communication, 1994). Given the above conclusions, a general "rule of thumb" was applied to differentiate naturally occurring inclusions from temper when necessary. Maturity of the sand inclusions whether temper or naturally occurring was also noted based upon the aforementioned criteria.

Bone Temper (n=5)

This paste group is based upon the presence of bone temper in percentages of at least 35% of the non-plastic inclusions. The clay matrix is brown to dark reddish-brown and constitutes a large portion of the paste; frequencies range from 43% in sample 1-174-061 to 69% in sample 1-174-203. The total non-plastics of the bone tempered sherds constitutes 30% to 49% of the paste. Porosity of the samples range between 1% and 8%.

The percentage of bone ranges from approximately 38% to 53% of the total non-plastics in the five samples. The bone inclusions are either subangular or angular in all five samples and are very deteriorated in sample 1-174-203. Burnt edges of the bone fragments was noted in samples 1-1038-167 and 2-596-007. Sand inclusions are present in all of the bone tempered samples in frequencies ranging from 23% to 46%. As in the grog tempered sherds, quartz is the main constituent of the sand (20% to 43%). Samples 1-174-284, 1-174-203, and 1-1038-167 have less quartz than samples 1-174-061 and 2-596-007, but contain a significant portions of other inclusions. Calcite is present in sample 1-174-284 (13%), and hematite is present in samples 1-174-203 and 1-1038-167 (10% and 17%). The calcite is considered a part of the sand inclusions, while the hematite is within the clay matrix. Other minor sand constituents include orthoclase and plagioclase feldspars, biotite, and chert ranging from 1% to 5%. The sand grains are subangular to subrounded and mature.

Using the Wentworth scale, the grain sizes range from 0.015 mm (fine silt) to 2.0 mm (granule) in size. The mean grain size ranges from .12 mm (very fine sand) to 1.05 mm (very coarse sand), and the mode varies from 0.63 mm (medium silt) to 1.0 mm (coarse sand). Among all the bone tempered ceramics, sorting of the grains is poor, and the largest inclusions are bone. All of the bone tempered samples possess inclusions of sedimentary rock fragments, with and without calcite, that range between 2% and 20%.

Grog Temper (n=2)

This paste group is based upon the presence of grog temper in percentages of greater than 10%. A brown or dark reddish brown clay matrix constitutes the majority of the grog-tempered paste (63%-75%). The total non-plastic inclusions are 24% for sample 1-41-032 and 35% for sample 1-960-211. The porosity among the grog-tempered pastes is low (1%-2%).

Of the non-plastic inclusions, grog is present at 12.5% in sample 1-41-032 and at 22% in sample 1-960-211. Sand is also present within both specimens at frequencies of 60% and 77% respectively. Most of the sand is composed of quartz inclusions, with orthoclase feldspars (3%) present as a minor constituent in specimen no. 10, and mica (1%) and chert (1%) present as minor constituents in sample 1-41-032. In both samples, the sand is subangular to subrounded and mature. Hematite constitutes 29% of the non-plastics in sample 1-41-032, but appears to be naturally incorporated within the clay matrix.

Using the Wentworth scale, the grain sizes range from 0.015 mm (fine silt) to 0.812 mm (coarse sand). The mean grain sizes are equivalent to 0.12 mm (very fine sand) for 1-960-211 and 0.21 mm (fine sand) for 1-41-032. The modes is 0.125 (fine sand) for sample 10, and for sample 1-41-032 is dispersed between 0.03 mm (medium silt) and 0.12 mm (very fine sand). Most of the non-plastic grains appear to be naturally occurring, however, the non-naturally occurring inclusions (grog) are the largest.

Sandy Paste (n=1)

This paste group is defined by the presence of sand at frequencies of at least 90%. The clay matrix is reddish brown and constitutes 59% of the paste. Non-plastics account for 30% of the paste. And of all the ceramic samples, the sandy paste sherd displays the highest porosity (11%).

In the one sample (1-1169-013) identified, sand constitutes 90% of the non-plastics inclusions. The sand is mature, and composed entirely of subangular well-sorted quartz grains. A majority of the grains represent medium silt sized particles with a mean of 0.036 mm (medium silt) and a mode equal to 0.031 mm (medium silt). Hematite constitutes the remaining 10% of the non-plastic inclusions and is contained within the clay matrix.

DISCUSSION

Analysis of the ceramic samples revealed three distinct paste groups: five bone tempered, two grog tempered, and one sandy paste. A comparison of the paste attributes of these ceramics and three sand samples show similarities among the bone tempered ceramics. The presence of mature sands composed of quartz and sedimentary silt fragments within all three sand samples and quartz and sedimentary rock fragments in each of the bone tempered sherds suggests that local resources were utilized in the manufacture of the ceramics in this paste group. I propose that the loose silty texture of the sediments in the sand was metamorphosed into hard nodules during the firing process. In addition, the grain size distribution of the sand samples 2 and 3 is similar to the grain size distribution within the bone tempered ceramics (excluding the larger bone inclusions). Furthermore the bone-tempered ceramics demonstrate remarkable similarities to other Toyah phase ceramic thin sections (Tables E-4, E-5, and E-6) (Reese-Taylor 1995, 1993; Reese-Taylor et al. 1994).

Comparative Data

Previous petrographic studies have demonstrated that different resource procurement patterns exist between northern and southern Toyah communities. The southern Toyah communities, represented by sites included within the Buda Project, demonstrate a wide array of paste groups, subgroups, and specific elements present in the tempers and clay matrices. The northern Toyah communities samples, represented by the O. H. Ivie Reservoir Project and the Rush Site Project, demonstrate a homogeneity within their paste groups, subgroups, and elements. The bone tempered ceramics from the current study fall within the range of variation previously defined for bone tempered ceramics during petrographic analysis of samples from these three Toyah ceramic assemblages (Reese-Taylor 1995, 1993; Reese-Taylor et al. 1994).

Ten ceramics, representing six vessels, were analyzed from the Rush Site (Table E-4) (Reese-Taylor 1995). Paste groups identified included bone tempered, sand and bone tempered, bone tempered with calcite inclusions, and sand and clay grit tempered. Variation between the pastes was minimal, and bone inclusions were present in all of the samples. The frequency of bone tempering varied between 5% and 34%. The overall homogeneity within the collection suggested a consistency in the ceramic manufacturing.

Two samples which fell outside the paste descriptions represented by the bulk of the collection were hypothesized as possible trade items.

Six bone tempered ceramics were selected for analysis and four paste groups were identified within the sample from O. H. Ivie Reservoir (Reese-Taylor 1993). These groups all included bone as their major tempering element, but demonstrated variations in either secondary tempering constituents or clay matrix with distinguishing characteristics (Table E-5). The four paste groups were bone tempered; bone tempered with carbonate rich clay; bone tempered with a sandy clay matrix; and bone and carbonate tempered.

Seven Toyah phase ceramics with bone temper were also recovered at 41HY209 by the Buda Archaeological Project (Table E-6) (Reese-Taylor et al. 1994). The paste types identified include bone tempered with a sandy clay matrix; bone tempered with a carbonate rich clay matrix; bone and sand tempered; and bone and carbonate tempered. These pastes all have bone inclusions ranging from 30.4% to 68.4% of the non-plastic inclusions. Variation occurs in the quartz and other secondary inclusions, many of which are naturally occurring within the clay matrix.

Table E-4 Petrographic Analysis from the Rush Site (41TG346) (Reese-Taylor 1995).

	RUSH SITE									
Sample No.	253 P22	510 P3	253 P14	510 P12	614 P1	657 P9	510 P17	628 P2	440 P1	199 P4
Count	200	200	200.01	200	100	200.01	200	200	200.02	201.02
Clay Matrix	50.00%	58.00%	49.50%	56.00%	54.00%	59.00%	45.50%	45.00%	38.50%	45.77%
Pores	8.50%	9.50%	6.00%	8.50%	11.00%	7.00%	5.50%	10.00%	5.50%	10.45%
Non-Plastics	41.50%	32.50%	44.50%	35.50%	32.00%	34.00%	49.00%	45.00%	56.00%	43.79%
Quartz	8.43%	10.77%	15.73%	16.90%	22.86%	27.94%	29.59%	30.00%	50.88%	73.85%
Bone	71.08%	83.08%	66.28%	76.06%	60.00%	58.81%	36.73%	41.11%	33.92%	4.54%
Calcite	12.05%	1.54%	10.11%	0.00%	11.43%	10.29%	15.31%	15.56%	6.25%	0.00%
Hematite	7.23%	4.62%	6.74%	7.04%	5.71%	2.94%	14.29%	7.78%	3.57%	3.41%
Chert	1.20%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.89%	2.27%
Orthoclase Feldspar	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.46%	0.00%
Clay Grit	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.08%	5.56%	0.00%	14.77%
SRF	0.00%	0.00%	1.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
VRF	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.14%
Biotite	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.01%	0.00%
Muscovite	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
Heavy Mineral	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
Distribution of Grain Sizes										
Clay, <0.0039	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Very Fine Silt, 0.0039-0.0078	0%	7%	0%	7%	7%	0%	7%	0%	0%	0%
Fine Silt, 0.0078-0.0156	7%	0%	7%	0%	7%	7%	7%	7%	0%	13%
Medium Silt, 0.0156-0.031	13%	7%	7%	13%	20%	0%	7%	0%	7%	0%
Coarse Silt, 0.031-0.0625	7%	33%	27%	13%	0%	7%	0%	20%	20%	27%
Very Fine Sand, 0.0625-0.125	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Fine Sand, 0.125-0.25	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Medium Sand, 0.25-0.5	73%	60%	53%	53%	67%	80%	73%	60%	73%	53%
Coarse Sand, 0.5-1.0	0%	7%	7%	7%	0%	0%	7%	13%	0%	0%
Very Coarse Sand, 1.0-2.0	0%	7%	0%	7%	0%	7%	0%	0%	0%	7%
mode	med sand	med sand	med sand	med sand	med sand	med sand	med sand	med sand	med sand	med sand
average (mm)	0.122	0.281	0.157	0.253	0.184	0.284	0.230	0.273	0.114	0.162

Table E-5 Petrographic Data from O. H. Ivie Reservoir (Reese-Taylor 1993).

	O. H. Ivie Reservoir					
Components	FS 2233.1	FS 1914	FS 1789.1	FS 1257.1	FS 1993.1	FS 6005.5
Count	200	200	200	200	200	200
Clay Matrix	70.00%	64.21%	35.20%	54.00%	54.80%	54.50%
Pores	0.00%	2.46%	7.90%	2.50%	5.30%	13.10%
Non-plastics	10.00%	33.33%	56.90%	43.50%	39.90%	32.50%
Quartz	3.33%	2.10%	1.05%	0.92%	27.32%	4.49%
Bone	86.67%	64.21%	48.86%	60.00%	63.66%	65.72%
Hematite	0.01%	7.38%	6.33%	12.41%	6.52%	11.94%
Carbonate	6.67%	7.38%	29.35%	19.08%	2.51%	-
Calcium carbonate	3.33%	17.88%	14.41%	5.06%	-	17.94%
Feldspar	-	-	-	-	-	-
Pyroxene	-	1.05%	-	-	-	-
Limonite	0.01%	-	-	-	-	-
Ooid	-	-	-	2.53%	-	-

Table E-6 Petrographic Data from Buda (Reese-Taylor et al. 1994).

	Buda							
	M1	M2	T1	T2	T3	T4	T5	T6
Count	200	200	200	200	200	200	200	200
Clay matrix	48.10%	43.70%	35.50%	34.50%	55.20%	38.60%	67.90%	58.70%
Pores	6.70%	5.70%	7.70%	1.50%	2.20%	13.60%	5.50%	4.00%
Non-plastics	45.20%	50.60%	56.80%	64.00%	42.60%	47.70%	26.60%	37.30%
Quartz	21.02%	63.24%	42.08%	43.75%	3.99%	12.37%	27.44%	45.19%
Feldspar	2.21%	3.95%	2.29%	0.78%	-	0.94%	-	-
Hematite	7.30%	2.37%	-	2.34%	9.15%	5.71%	6.77%	4.81%
Bone	68.47%	30.40%	55.63%	44.69%	62.21%	47.58%	51.88%	50.00%
Pyroxene	1.11%	-	-	-	0.94%	-	-	-
Carbonate	-	-	-	0.78%	23.47%	29.52%	10.53%	-
Calcium carbonate	-	-	-	7.66%	-	2.93%	-	-
Chert	-	-	-	-	-	0.94%	-	-
Ooid	-	-	-	-	-	-	3.38%	-

The percentage of bone as part of the total non-plastic inclusions within the Fort Hood sample aligns most closely with the percentages identified in the sample from Buda. Bone ranges from 38.71% to 53.49% in the current sample. Quartz and sedimentary silt (local sand) comprise the two other most frequently occurring constituents. Within the Buda sample, bone ranges from 30.40% to 68.47%. Sand, in the form of quartz, alkaline feldspar, and carbonate grains, is the second most frequently occurring constituent. In both the Rush Site and the O. H. Ivie Reservoir samples, bone occurs at significantly higher frequencies, ranging from 33.92% to 83.08% and 48.86% to 86.67% respectively. Other constituents occur in correspondingly low ranges. These percentages of bone tempering and sand, presumably a local resource if not naturally occurring, suggest slightly different manufacturing traditions throughout the Toyah region. This differentiation occurs as less of a north-south split than an east-west division.

Toyah ceramic tradition may be more specifically defined using the petrographic data derived from the current study in association with the previous studies of Toyah phase ceramics from the Southern Plains and Central Texas. These studies indicate that Toyah potters used bone temper with a limited variety of clay resources. The bone tempering constitutes from 12% to 23% of the total points counted in the ceramics from the current study, the average amount of bone temper is 17.6% with a standard deviation of ±4.59% (Table E-7). The Rush Site ceramics have a similar range with bone temper present between 18% to 29.5% with an average of 23.3% and a standard deviation of ±4.6%. The ceramics from the O. H. Ivie Reservoir study demonstrate the most homogeneity in the amount of bone tempering used. The bone tempering constitutes from 21.4% to 27.8% of the total points with an average of 24.7% and a standard deviation of ±2.6% (Table E-7). The bone tempering from the Buda Project ceramics range from 13.8% to 65% of the total points counted with an average of 30.6% and a standard deviation of ±14.8% (Table E-5). These averages and standard deviations reflect considerable homogeneity among the ceramics from the three areas compared. The average of the bone tempering from all three ceramic assemblages is 22.3% with a standard deviation of 2.75% (Table E-5).

This homogeneity in the ceramic assemblages from three distinct areas is strong evidence for a widespread, cohesive tradition among Toyah potters. The data suggests that the variation seen in and between the various assemblages is most reflective of different naturally occurring bodies in the clay matrix, although at times the use of sand as a temper in conjunction with the bone is indicated. We propose based upon the consistent amount of bone present in the pastes of all the ceramics that the inclusion of sand as a tempering agent occurs when the clay matrix does not have enough naturally occurring non-plastics.

Table E-7 Frequency of Bone Tempering by Project Region.

Project Areas	Rush	O. H. Ivie	Buda	Fort Hood	Total
Frequency of Bone Tempering*	29.50%	26.00%	31.00%	23.00%	
	29.50%	21.40%	15.40%	12.00%	
	21.00%	27.80%	31.60%	14.00%	
	18.50%	26.10%	28.60%	16.00%	
	20.00%	25.40%	26.50%	23.00%	
	18.00%	21.36%	22.70%	-	
	27.00%	-	13:80%	-	
	27.00%	-	18.70%	-	
	19.00%	-	-	-	
Average	23.28%	24.68%	23.54%	17.60%	22.27%
Standard Deviation	4.60%	2.60%	6.52%	4.59%	2.75%

* Frequency of bone within total point count.

In conclusion, through the current petrographic study we have added strong evidence for the homogeneity of the Toyah ceramic tradition, and when compared to assemblages from other known Toyah phase sites, the evidence for a shared ceramic tradition shared among these people is even more convincing. The homogeneity seen in the averages and standard deviations argues for an intentional amount of bone tempering being applied within these ceramics over a wide area.

This homogeneity within Toyah ceramics also highlights possible exotic trade wares within specific assemblages. Within the current study two sherd stands out as possible trade items. The two ceramics that are grog tempered are likely imports from the Caddo region. In type of temper, frequency of non-plastics, and comparably low porosity, they fall within the range of grog and sand tempered ceramics from the southern Caddo area (Reese-Taylor in press, 1993a). Within the Buda assemblage, a non-local vessel, possibly of Caddo origin was also identified, implying trade networks between the eastern Toyah and the southern Caddo (Reese-Taylor et al. 1994). The sandy paste sherd is strikingly different from ceramics indigenously produced with both the Toyah and Caddo regions.

Although the sample size of this analysis was small, the results clearly undermined the premise set forth by Johnson in the Buckhollow site report (Johnson 1994). There was no evidence for a wider range of movement among northern Toyah groups. To the contrary, this study implied that all Toyah people followed small herds of bison and exploited natural resources within fairly circumscribed areas. Indeed if any distinction can be made based upon the current analysis compared with previous petrographic work, that distinction can be based on manufacturing traditions and lies on an east-west axis, as opposed to a north-south.

Finally, studies of this nature invariably suggest avenues for future research. The extent of the trade between the Toyah people and other cultural groups, such as the Caddo, has been a subject of speculation, and was once again highlighted by the possibility of a Caddoan produced vessel within the Buda ceramic assemblage and two potential Caddo grog-tempered ceramics within the current assemblage (Reese-Taylor et al. 1994). Petrographic analysis offers a productive methodology for exploring this issue.

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APPENDIX F

ANALYSIS OF VERTEBRATE REMAINS

by
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ANALYSIS OF VERTEBRATE REMAINS

INTRODUCTION

This analysis includes the non-human vertebrate faunal material recovered from 35 sites on Fort Hood in Central Texas. This material was recovered from Prehistoric archeological sites, although some of the material was historic in origin (Taxa and Niche Descriptions). The goals of this analysis were to record basic descriptive data on each skeletal element, by site, including identification, taphonomy, and niche characteristics.

METHODS

Faunal material was recovered from both open camp and rock shelter localities. Analysis and attribute recording were performed after the material was sorted. Identifications were made using the University of North Texas, Institute of Applied Sciences' Zooarchaeology Laboratory collection. Osteological guides used to aid in the identification include Auffenberg (1969) for snakes and Olsen (1968) for other herpetofauna, and Lawrence (1951) for deer and deer-sized artiodactyls, and Balkwill and Cumbaa (1992) for cattle and bison. A variety of other osteological guides were used as well (Glass 1951; Hillson 1986; and Olsen 1964). No specific identifications were made solely upon criteria provided in the guides. If a guide was used, but comparative material was not available, or the traits described in the guide could not be definitively recognized in the comparative material, then the identification was list as "cf." or "compares favorably." A basic taxa list for the full analysis is listed in Table F-1. A breakdown of the taxa by site is listed in Table F-2. Attribute recording was accomplished initially using a vertebrate faunal attribute coding system (Shaffer and Baker 1992). Attributes addressed include provenience, taxon, element, symmetry, and basic taphonomic information. The taphonomic information included weathering, breakage, burning, gnawing, and cut marks. Unique observations, such as medical disorders or cut marks, were recorded in a comments field. Unique specimens were observed under magnification, either a 10x hand lens, or a light microscope up to 30x.

Specimens that could not be identified to the level of Order or below were identified on the basis of size and recognizable attributes. For example, specimens that were too small to identify to the level of class were identified simply as "Vertebrata." For fish that could only be identified to class Osteichthyes, size was estimated based on vertebra centrum diameter. Fish vertebrae less than five millimeters were designated as small. Other fish specimens were identified as "Osteichthyes" only because no reliable standard could be established on elements other than the vertebrae. Bird sizes identified include small birds (sparrow-sized), medium birds (jay or dove-sized), and large birds (duck, turkey, goose-sized). Mammal sizes identified include micro (shrew to mouse-sized), micro/small (mouse/rat/rabbit-sized), small/medium (rabbit/canid sized), medium (raccoon/canid-sized), medium/large (canid/deer sized), large/very large (deer/bison-sized), and very large mammal (bison-sized). While these levels of identification do not provide detailed taxonomic information, they do provide an estimate of the sizes of taxa represented by the unidentifiable elements. Specimens identified to these estimated sizes came from animals at least in size of the estimate given.

As specimens were sorted and identified, each identified group from a given lot were rebagged and labelled as to their identification. These sub-bags were placed back inside the original lot bags. All non-faunal material was returned to Mariah Associates for appropriate analysis. A few isolated human specimens were recovered with the faunal remains and were promptly returned to Mariah Associates for proper treatment. Skeletal elements that were culturally modified, as into awls, were returned to Mariah Associates for further description and curation. While these specimens were counted in the specimens counts presented below, they were not described further in this faunal section. Quantification of the Fort Hood faunal remains was based on the number of identified specimens (NISP). NISP is simply the specimen counts for the assemblage and for the identified taxa in the assemblage. In cases of articulated specimens, such as mandibles and teeth, the teeth were recorded and counted separately. In this way, both loose and articulated specimens were tallied and appropriately represented.

FINDINGS

Taxa and Niches

A variety of taxa was recovered from the 35 sites at Fort Hood. All of the taxa recovered are not unexpected taxa and fall within known current or historically recorded ranges. Table F-3 shows the basic niche information for each of the major non domestic taxa identified. Note that categories such as Mammalia, Artiodactyla (ungulates) were not used because the information is simply too generalized. Niche information was characterized based on information presented in Conant (1975), Davis (1978), Robbins et al. (1983), and Schmidly (1983).

From Tables F-2 and F-3, it is clear that the sites with the highest NISP also tend to have the highest taxonomic diversity and niche representation. For example, the sites with the highest diversity are 41BL821, 41BL886, 41CV97, 41CV174, and 41CV1007. With the exception of 41BL886, these sites also happen to be open camp sites and not rock shelter sites.

When the data in Table F-2 are compared between open camp and rock shelter sites, it is clear that more specimens were recovered from the open sites (n=5,278) than rock shelters (n=1,738). While rock shelters were outnumbered by specimen counts of nearly 3:1, they did out produce open sites for taxa such as snakes, opossums, cottontail rabbits, rats (both wood rat and cotton rat), and carnivores (bear, raccoon, mustelid, dog, bobcat). Such a discrepancy between site types can be attributed, in part, to microniche preferences.

Snakes, opossums, rats, and carnivores may all use rock shelters as denning areas. Hence, there remains would be more expected in the shelter sites than the open air sites. Additionally, of the taxa from the rock shelters, only the opossum exhibited cut marks (n=2, See Findings below), and only one carnivore (raccoon), one cricetid rodent (either wood rat or cotton rat), and five cottontail rabbit remains exhibited spiral fractures. None of these select taxa was burned. Since spiral fractures only indicate that the bone was broken while still containing collagen and not the agency involved (Johnson 1985), the spiral fracturing on the raccoon, rats, and cottontail may be natural and not cultural. Hence, the conclusion drawn from these taxa and the rock shelters is that the rock shelters are more likely to contain intrusive taxa, and these taxa will probably occur in higher frequencies than in the open camp sites. The rock shelters, therefore, may be a home to these animals either before, during, or after human occupation.

Additional differences between the rock shelters and open camp sites are found in the frequencies of the taxa identified as

Table F-1 Taxa Recovered from Fort Hood.

Taxon	Common Name	Total
Vertebrata	Vertebrates	1,507
Osteichthyes (Small)	Small bony fish	1
Osteichthyes	Bony fish	1
Lepisosteus sp.	Gars	1
Anura	Toads and frogs	2
Bufo sp.	Toads	2
Testudinata	Turtles	51
Kinosternidae	Mud and musk turtles	1
Emydidae	Water and box turtles	1
Terrapene sp.	Box turtles	1
Trionyx sp.	Softshell turtle	2
Serpentes	Snakes	2
Colubridae	Colubrid snakes	2
Viperidae	Pitviper snakes	7
cf. Crotalus sp.	Rattlesnakes	1
Aves (Small)	Small birds	3
Aves (Medium)	Medium birds	1
Aves (Large)	Large birds	15
Aves	Birds	2
Cathartidae	Vultures	1
Mammalia (Micro)	Micro mammals	1
Mammalia (Micro/small)	Micro/small mammals	4
Mammalia (Small)	Small mammals	1
Mammalia (Small/medium)	Small/medium mammals	46
Mammalia (Medium)	Medium mammals	3
Mammalia (Medium/large)	Medium/large mammals	4,059
Mammalia (Large/very large)	Large/very large mammal	133
Mammalia (Very large)	Very large mammal	90
Mammalia	Mammals	208
Pidelphis virginiana	Virginia opossum	53
cf. Didelphis virginiana	Virginia opossum	2
Dasypus novemcinctus	Nine-banded armadillo	3
Leporidae	Rabbits and hares	8
Lepus californicus	California jackrabbit	9
Sylvilagus sp.	Cottontail rabbits	81
Rodentia (Small)	Mouse-sized rodent	4
Rodentia (Small/Medium)	Mouse/rat-sized rodent	9
Rodentia (Medium)	Rat-sized rodent	16
Rodentia (Large)	Muskrat/beaver-sized rodent	1
Sciuridae	Squirrels and chipmunks	3
Geomys bursarius	Plains pocket gopher	4
Castor canadensis	Beaver	1
Cricetidae (Medium)	Rat-sized cricetid rodent	7
Sigmodon sp.	Cotton rats	43
cf. Sigmodon sp.	Cotton rats	1
Neotoma sp.	Wood rats	9
Carnivora	Carnivores	12
Ursus americanus	Black bear	1
Procyon lotor	Raccoon	13
Mustelidae	Weasels, minks, skunks, etc.	3
Canis sp.	Dogs	3
Felis rufus	Bobcat	1
Artiodactyla	Even-toed ungulates	9
Artiodactyla (Medium)	Deer/pronghorn-sized ungulates	238
Odocoileus sp.	Deer	149
Antilocapra americana	Pronghorn antelope	3
Bison bison	Plains bison	6
cf. Bison bison	Plains bison	12
Bos/Bison	Cattle/bison	55
cf. Capra hircus	Goat	1
cf. Ovis sp.	Sheep	39
Ovis/Capra	Sheep/goat	68
Total		7,016

Table F-2 Taxon Frequencies by Site.

Taxa	BL154	BL168	BL198	BL339	BL433	BL538	BL567	BL568	BL740	BL744	BL754	BL755	BL765	BL821	BL834	BL886	BL888	CV95	CV97	CV137	CV164	CV174	CV587	CV595	CV960	CV1007	CV1011	CV1038	CV1085	CV1105	CV1116	CV1136	CV1167	CV1200	CV1423
Vertebrata	3	4	19	62	131	7	58	2	7	25	34	5		136		88	28	4	458	72	17	67	37	3	13	19	78	79				12	12	7	20
Osteichthyes (Small)							1																												
Osteichthyes																			1																
Lepisosteus sp.														1																					
Anura														1					1																
Bufo sp.																			2																
Testudinata	5			1	4					1	1			2					10	21		1			1	1								3	
Kinosternidae				1																															
Emydidae																			1																
Terrapene sp.										1																									
Trionyx sp.				1															1																
Serpentes																2																			
Colubridae																			1			1													
Viperidae										2						5																			
cf. Crotalus sp.																1																			
Aves (Small)																2			1																
Aves (Medium)																1																			
Aves (Large)		1			2	1				1				1		4			1				1					1							2
Aves																																			2
Cathartidae																																			1
Mammalia (Micro)																											1								
Mammalia (Micro/small)																3			1																
Mammalia (Small)					1																														
Mammalia (Small/medium)				1	1				1	2						33			5			1	2												
Mammalia (Medium)																2			1																
Mammalia (Medium/large)	35	12	11	84	167	13	10	1	13	16	53	48		574	1	135	69	21	819	486	6	383	180	7	76	250	306	107		5	1	3	140	29	
Mammalia (Large/very large)	2				1													1	16	2	14	74	2			2	6	13							
Mammalia (Very large)														1		1			7	4		52				3	2	18						2	
Mammalia	1			3			2			5		1				4			49			20		11	11	44	2	6				2	41	4	
Didelphis virginiana										5	1			1		36			7													3			
cf. Didelphis virginiana										1						1																			
Dasypus novemcinctus											2														1										
Leporidae	2													1		4			1																
Lepus californicus														2		1	1		4	1															
Sylvilagus sp.	2	1			1	1				17	1					38			5	1		2		6		1	3	2							
Rodentia (Small)																4																			
Rodentia (Small/Medium)																9																			
Rodentia (Medium)					3	1										10				2															
Rodentia (Large)																1																			
Sciuridae														2																			1		
Geomys bursarius																1			2														1		
Castor canadensis																			1																
Cricetidae (Medium)																7																			
Sigmodon sp.	1															42																			
cf. Sigmodon sp.																1																			
Neotoma sp.																8			1																
Carnivora					1											9			2																
Ursus americanus																1																			
Procyon lotor																9	1			2							1								
Mustelidae																3																			
Canis sp.																1						2													
Felis rufus																1																			
Artiodactyla		1									1								3			3						1							
Artiodactyla (Medium)	3			8	11		1			4		1	1	42		7	4		43	36		14	14	2	3	7	17	2					13	5	
Odocoileus sp.		1		2	16			1			1			14		2	4		40	18		3	4		2	2	14	4					18	3	
Antilocapra americana																	1		1			1													
Bison bison																						5					1								
cf. Bison bison																					1	11													
Bos/Bison	1										1			1						12	19	14	3				1	2							
cf. Capra hircus																			1																
cf. Ovis sp.																			39																
Ovis/Capra																			68																
Cervidae																																		1	
Site Subtotals	55	20	30	163	339	23	72	4	21	80	95	55	1	779	1	477	108	26	1,593	657	57	654	243	29	107	329	432	235	0	5	1	20	226	54	25
GRAND TOTAL	7,016																																		

medium/large, large, large/very large, very large mammal, medium artiodactyl (deer-pronghorn-sized), deer, pronghorn, bison, and cow/bison. While the open air sites have nearly three times more material than the rock shelters (by NISP counts), these categories of larger animals occur in open air sites at frequencies higher than three times the frequencies of larger animal remains in the rock shelters. For example, only three bison or cow/bison remains came from rock shelters where as 69 came from open camp sites. Medium artiodactyl, deer, and pronghorn accounted for 86 specimens in the rock shelters and 304 specimens in the open air sites.

Based on the information presented here, the majority of remains and taxonomic and niche diversity were derived from open camp sites. Rock shelter sites usually had fewer remains and lower taxonomic diversity; 41BL886 being the exception. The shelter sites, however, did possess more taxa that would be expected to use the shelters for

Table F-3 Taxa by Site and Environment.

Taxa	Habitat	BL154	BL168	BL198	BL339	BL433	BL538	BL567	BL568	BL740	BL744	BL754	BL755	BL765	BL821	BL831	BL886	BL888	CV95	CV97	CV137	CV164	CV174	CV587	CV595	CV960	CV1007	CV1011	CV1038	CV1085	CV1105	CV1116	CV1136	CV1167	CV1200	CV1423
Osteichthyes	A								■																											
Lepisosteus sp.	A														■																					
Bufo sp.	C/A																			■																
Kinosternidae	R				■																															
Terrapene sp.	F/G										■																									
Trionyx sp.	A				■															■																
cf. *Crotalus* sp.	F/G																■																			
Cathartidae	C																																			■
Didelphis virginiana	F/R										■	■			■		■			■													■			
Dasypus novemcinctus	F/R											■														■										
Lepus californicus	G														■		■	■		■	■															
Sylvilagus sp.	F/G	■	■			■	■				■	■					■			■	■		■		■		■	■	■							
Sciuridae	F														■																			■		
Geomys bursarius	G																■			■														■		
Castor canadensis	A/R																			■																
Sigmodon sp.	G	■															■																			
Neotoma sp.	F/G																■			■																
Ursus americana	F/R																■																			
Procyon lotor	F/R																■	■		■								■								
Mustalidae	C																■																			
Canis sp.	C																■					■														
Felis rufus	C																■																			
Odocoileus sp.	C		■		■	■			■			■			■		■	■		■	■		■	■		■	■	■	■					■	■	
Antilocapra americana	G																	■		■			■													
Bison bison	G																					■	■					■								
Bos/Bison	G	■										■			■						■	■	■	■				■	■							

Habitat Types:
A = Aquatic
F = Forest/Forest Edge
G = Grassland
R = Riparian (area immediately adjacent to water)
C = Cosmopolitan, in or near all described areas

denning locations. Open camp sites had more larger taxa, especially deer and bison-sized taxa. Bison and bison-sized taxa were very rare in the shelter sites. Thus, humans occupying shelter locations either did not hunt, or could not bring back bison-sized animal remains still containing bone to shelter localities.

Cultural Taphonomy

Cultural taphonomy includes those factors affecting the faunal assemblage that can be linked with human activity. These factors include burning, breakage, and cut marks. However, both burning and breakage may have natural causes. Natural burning of the faunal assemblages can be safely ruled out due to the presence of calcined bone in many of the assemblages. Shipman et al. (1984:323) suggested that grass fires can be eliminated as a cause of noticeably burned bones because these fires burn at lower temperatures and of shorter duration than is required to produce calcined bone.

In looking at factors of burning, the differences between shelters and open camp sites are not great in terms of relative frequencies (Table F-4) as with the spirally fractured bone (Table F-5). Total burned specimens for shelters was 568 (33%) of the 1,738 specimens recovered, and 1,168 (22%) of the 5,278 specimens recovered for open camp sites, indicating burning was more common in shelters, when relative frequencies are compared. When the burning is broken down by type, the same pattern is apparent with the shelters showing relatively higher amounts of charred (burned black) or calcined (burned white) specimens. Spirally fractured bone only indicates that the bone was broken while still in a fresh state, that is, still containing collagen (Johnson 1985:172)., Spiral breakage does not indicate the cause of the break. Both humans and carnivores may produce spirally broken bone when processing or consuming animal remains. With the exception of a cottontail tibia and pelvis from 41BL744, both exhibiting opposing puncture marks that may be from a small carnivore (but no spiral fractures), there is no indication of carnivore damage to any of the other material to implicate carnivores as a significant contributor to the spirally fractured assemblages. In fact, five specimens were identified with impact fractures from four of the sites. These

fractures are most likely the result of human activity, indicating humans are the primary agent responsible for the spiral fractures.

Johnson (1985:192) described bone breakage technique as placing a bone over one or two anvils and striking the bone with high velocity with an object such as a hammerstone. This technique is efficient for opening the bone to expose marrow, and will produce an impact fracture. Descriptions by Leechman (1951:355-356) and Lintz (1976:87-88) concur with this method breaking bone for grease or marrow extraction. Specimens with impact points include two fragments of medium/large mammal and one from a deer-sized artiodactyl metatarsal from 41CV137, one medium/large mammal fragment from 41CV1038, and one deer-sized artiodactyl metatarsal from 41BL821, all open camp sites. Several of the sites exhibited relatively high percentages of spirally fractured material for assemblages with more than 300 total specimens (Table F-5). Eight sites had assemblages with over 300 specimens recovered. Rates of spiral breakage varied between 11 and 45% with five of the sites having 24% or more spiral breakage. These higher frequencies are probably the result of marrow processing, and at 41CV137, the 45% spiral breakage is more indicative of grease processing.

Cut marks were infrequent in the assemblages with only 15 specimens identified with cuts. Ten of the specimens were from open air camp sites and five were from the rock shelter of 41BL886. From the open camp sites, three specimens were from 41CV97, two of which were medium/large mammal fragments, one was a deer-sized artiodactyl bone fragment with three sets of transverse cuts. From 41CV137, one deer-sized artiodactyl metatarsal was grooved with a tool in the naturally occurring dorsal groove, and in a parallel location on the interior of the bone under the dorsal groove. These cuts appear to have been to facilitate the splitting of the bone metatarsal, probably for tool manufacture.

Table F-4 Burning by Site.

Site	Unburned	%	Charred	%	Calcined	%	Total
41BL154	51	93	2	4	2	4	55
41BL168	11	55	5	25	4	20	20
41BL198	30	100					30
41BL339	151	93	2	1	10	7	163
41BL433	212	63	39	12	88	26	339
41BL538	22	63	1	4			23
41BL567	52	72	19	26	1	1	72
41BL568	2	50			2	50	4
41BL740	15	71	1	5	5	24	21
41BL744	72	90	5	6	3	4	80
41BL754	48	51	33	35	14	15	95
41BL755	17	31	18	33	20	36	55
41BL765	1	100					1
41BL821	471	60	212	27	96	12	779
41BL834			1	100			1
41BL886	450	94	22	5	5	1	477
41BL888	98	81	9	8	1	1	108
41CV95	23	88	3	12			26
41CV97	1,264	79	243	15	86	5	1,593
41CV137	466	71	159	24	32	5	657
41CV164	57	100					57
41CV174	586	90	46	7	22	3	654
41CV587	211	87	28	12	4	1	243
41CV595	25	86	1	3	3	10	29
41CV960	77	72	17	16	13	12	107
41CV1007	258	78	49	15	22	7	329
41CV1011	190	44	191	44	51	12	432
41CV1038	226	97	6	3	1		233
41CV1085					2	100	2
41CV1105	5	100					5
41CV1116			1	100			1
41CV1136	17	85	1	5	2	10	20
41CV1167	173	77	37	16	16	7	226
41CV1200	45	83	9	17			54
41CV1423	25	100					25
Total	5,351	76	1,160	17	505	7	7,016

Two deer-sized artiodactyl specimens from 41CV587 were also cut. One was a humerus with six or more cuts on the medial side. The other specimen was a carpal with a cut on the lateral side. The only bison-sized specimen with cut marks is a very large mammal rib fragment with over 30 fillet-type transverse cuts from 41CV1007. Additional transverse cuts were identified on two medium/large mammal fragments from 41CV1038 and on a deer-sized artiodactyl femur from 41BL821.

From 41BL886, as mentioned previously, five specimens were cut. Surprisingly, two of the specimens were opossum. Even though opossum was identified above as quite possibly being a natural intrusive into the site based

on denning behavior, cut marks indicate that it was also butchered by humans. One epipubic bone (pouch bone) exhibited two transverse marks. Two additional cut marks were found in the semi-lunar notch of an ulna. Other cut marks from this site were identified on a deer sized artiodactyl tibia fragment (more than six transverse marks) and on two medium/large mammal fragments with over four cuts on one, and five on the other.

Natural Taphonomy

Three major factors of natural taphonomy were addressed. These include weathering, rodent gnawing, and angular breakage. A fourth factor, chemical dissolution was common throughout the assemblages, but was not quantified. Chemical dissolution appears to have been the result of natural carbonic acids produced by a combination of rain and the limestone bedrock of the area. This form of degradation was superficial on most specimens, although it could have obliterated evidence of cut marks.

Most of the materials recovered were not significantly weathered, although 26 specimens exhibited fine-line cracking, exfoliation, and surface deterioration indicating pronounced exposure to the environment. Specimens with marked weathering were recovered from 41BL433 (n=5), 41BL740 (n=5), 41BL888 (n=1), 41CV164 (n=14), and 41CV1007 (n=1). Rodent gnawing was present on 50 specimens. Sites with rodent gnawing include 41BL339 (n=1), 41BL744 (n=2), 41BL754 (n=2) 41BL886 (n=18), 41CV95 (n=3), 41CV97 (n=8), 41CV137 (n=7), 41CV174 (n=2), 41CV587 (n=1), 41CV1007 (n=2), 41CV1038 (n=1), and 41CV1200 (n=30). Neither marked weathering nor rodent gnawing appear to be significant taphonomic factors. Aside from the two rabbit bones with puncture marks mentioned above, no other specimens were identified with carnivore marks or gnawing.

Table F-5 Breakage by Site.

Site	Angular	%	Spiral	%	Unbroken	%	Total
41BL154	44	80	11	20			55
41BL168	11	55	9	45			20
41BL198	24	80	6	20			30
41BL339	114	70	47	29	2	1	163
41BL433	255	76	84	24			339
41BL538	16	70	7	30			23
41BL567	63	88	8	12	1	0	72
41BL568	4	100					4
41BL740	19	91	2	9			21
41BL744	51	64	17	22	12	15	80
41BL754	64	68	27	29	4	5	95
41BL755	31	57	24	43			55
41BL765	1	100					1
41BL821	487	63	285	37	7	0	779
41BL834	1	100					1
41BL886	342	72	54	12	81	17	477
41BL888	77	72	30	28	1	0	108
41CV95	18	70	8	30			26
41CV97	1,059	67	455	29	79	5	1,593
41CV137	357	55	291	45	9	2	657
41CV164	50	88	1	2	6	11	57
41CV174	545	84	96	15	13	2	654
41CV587	145	60	93	39	5	1	243
41CV595	21	73	4	14	4	14	29
41CV960	80	75	27	25			107
41CV1007	291	89	35	11	3	0	329
41CV1011	291	68	139	33	2	0	432
41CV1038	167	72	66	28			233
41CV1085	2	100					2
41CV1105	5	100					5
41CV1116	1	100					1
41CV1136	20	100					20
41CV1167	157	57	61	27	8	4	226
41CV1200	31	58	23	42			54
41CV1423	25	100					25
Total	4,868	70	1,911	28	237	2	7,016

Angular breakage was pronounced at many sites (Table F-5) and represents the largest single taphonomic factor affecting the assemblages. Sites exhibited between 57 and 100% angular breakage. Angular (or step) fracturing of bone, occurs in bone after collagen has been lost (Johnson 1985). Elements such as long bones, phalanges, metapodials, of birds and mammals will break with a fresh or spiral fracture if they contain collagen (Johnson 1985). Many elements, however, do not break in a manner where it can be determined if collagen was present or not. For example, bones of fish, amphibians and reptiles generally will not spirally fracture. Mammal and bird crania, teeth, vertebrae, podials, and sesamoids usually will not show spiral fracturing either.

Unique Observations

Unique observations take the form of pathological specimens and unique or unexpected occurrences in the assemblages discussed in this report. The only example of pathology is that of two viperid snake (poisonous) vertebrae that were fused together. These fused vertebrae were recovered from 41BL744. While this is a pathological condition, there are no indications as to the cause of the disorder.

Three types of animals also were not expected in the assemblages because the sites were reported to be prehistoric. These animals include armadillo, goats, sheep, and goat/sheep indeterminate. The armadillo was identified based on dermal armor found at 41BL754 (rock shelter) and 41CV960 (open camp site). This animal is a historic migrant into Texas (Schmidly 1983:98-104, and references therein) and would not have been part of the prehistoric components of the sites.

Goat, sheep, and goat/sheep remains were identified from only one site, 41CV97 (open camp site). These animals are Old World domesticates brought into the New World by Europeans. This site had a substantial accumulation of these animals with no fewer than five individuals represented by calcanei, the single most common element. None of the goat or sheep specimens exhibited butchering marks or any other indications of processing.

DISCUSSION

Faunal material from 35 prehistoric archeological sites on Fort Hood were analyzed. Many of the sites were represented by only a few specimens and little information could be gleaned from those samples. Those sites with higher frequencies provided better information. With the exceptions of the historic introductions, all of the taxa identified from these sites are expected in this region. Many of the opossum, carnivores, rat, and snake remains were recovered from rock shelters. These locations may have served as denning locations for these taxa. Thus, not all of them will be cultural. However, the two opossum remains were identified with cut marks, indicated that they were not natural intrusives into 41BL886. Other specimens with cut marks were infrequent throughout the assemblages.

Other cultural indications came from breakage and burning of the material. High rates of spiral fractures and associated impact fractures indicates that humans were a substantial contributor to the faunal assemblages. Burning, and more specifically calcination of the faunal material also supports this conclusion.

Non-cultural agents affecting the assemblages included chemical dissolution, weathering, rodent gnawing, and angular breakage. Although common, chemical dissolution of the faunal material did not appear to have produced a significant impact on the assemblage. Neither did weathering or rodent gnawing. Angular fracturing of much of the material appears to have been the most common and most significant natural agent serving to degrade the assemblages.

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APPENDIX G

MACROBOTANICAL REMAINS

by
J. Philip Dering

MACROBOTANICAL REMAINS

INTRODUCTION

This report presents results of the analysis of 83 macrobotanical samples collected from 26 archeological sites. The material was collected during NRHP testing. The purpose of the macrobotanical analysis was to identify the plant remains and to assess the potential of each site to generate macrobotanical data during subsequent excavation and analysis. The sites were located in a variety of geomorphic contexts.

METHODS

The entire sample was analyzed by scanning the material for seeds and wood. Both the carbonized and uncarbonized plant materials were scanned, selected and identified. The purpose of the scan samples was to provide a quick, cost-effective means of evaluating the richness of a sample in terms of the presence plant remains. The scans also were to provide a presence/absence assessment of seeds, fruit fragments, bulb fragments or other non-woody plant parts in the samples. The scan samples were not intended to include a complete analysis of carbonized wood fragments. In the richer samples up to ten carbonized wood fragments were examined and identified.

Each scan sample was sorted through a series of four brass nested geological screens with mesh sizes ranging from 4 mm to 0.450 mm. Each size grade was scanned for propagules under a binocular dissecting microscope at eight magnifications. In addition, carbonized wood fragments were separated from the 4 mm and 2 mm screens after which five fragments were examined. Identifications were made using reference collections at Texas A&M University. The scan samples were not intended to include a complete analysis of carbonized wood fragments, but rather to provide a description of the plant material present, and to assess the potential of each site for further research.

RESULTS

Uncarbonized plant remains were recovered in samples from all of the sites. Carbonized plant remains were identified samples from 18 of the 26 sites. Many of the uncarbonized seeds and root fragments were fresh enough to indicate that bioturbation by plant growth was a significant factor at most of the sampling locations, even the shelter sites. Herbivore feces at 41BL765 and 41BL881 also should signal the presence of bioturbation. For this reason, my evaluation of the data potential at each site is based strictly on the presence/absence of carbonized plant remains. This is standard procedure for open archeological sites of the middle latitudes of North America in humid to semi-arid precipitation regimes (Miksicek 1987).

The analysis identified the carbonized remains of at least nine plant taxa from the 83 samples. The wood of seven different taxa and the seeds or nut fragments of four taxa were recovered from the samples. I included some of the remains of the calcareous nutlet of hackberry, because they showed evidence of burning. In contrast to the carbonized plant assemblage, many more taxa were represented in the uncarbonized plant assemblage. The uncarbonized seeds of 15 different taxa, and the wood of only two identifiable taxa were identified. Roots exhibiting little or no deterioration and some which had been cut, presumably by excavation equipment, made up most of the uncarbonized woody plant material in the samples. They provided direct evidence of active plant growth in both open and shelter sites. Table G-1 lists the carbonized plant remains and Table G-2 lists the noncarbonized remains by site and field sample number.

Interestingly, oak in the form of carbonized wood, was the most abundant taxon noted in the samples. Only 41BL567 and 41BL765 contained evidence of carbonized juniper. On the other hand, uncarbonized evidence of juniper was recovered from 12 sites in the study. Oak exhibited the opposite trend; only three sites contained

Table G-1 Carbonized Plant Remains by Site and Field Sample Number.

Site	Geomorphic Context	Field Sample	Common Name	Taxon	Part
BL168	Shelter	24	Live Oak Wood Type	Quercus sp.	Wood
BL339	Alluvial Terrace	226	Live Oak Wood Type	Qucrcus sp.	Wood
BL433	Shelter	27	Live Oak Wood Type	Quercus sp.	Wood
		21	Live Oak Wood Type	Qucrcus sp.	Wood
		30		Indeterminable	Wood
		18	Live Oak Wood Type	Quercus sp.	Wood
		24	Live Oak Wood Type	Quercus sp.	Wood
		33	Live Oak Wood Type	Quercus sp.	Wood
		21	Pecan	Carya illinoiensis	Nut
BL567	Shelter	30	Juniper	Juniperus sp.	Wood
		42	Juniper	Juniperus sp.	Wood
		42	Live Oak Wood Type	Quercus sp.	Wood
		30	Live Oak Wood Type	Quercus sp.	Wood
		38	Live Oak Wood Type	Quercus sp.	Wood
		38	Juniper	Juniperus sp.	Wood
		29	Walnut	Juglans sp.	Nut
		39		Indeterminable	Wood
		30	Pecan	Carya illinoiensis	Wood
BL754	Shelter	17	Juniper	Juniperus sp.	Seed
		26	American Sycamore	Platanus occidentalis	Wood
		17		Indeterminable	Wood
BL765	Shelter	18	Juniper	Juniperus sp.	Wood
		12	Juniper	Juniperus sp.	Wood
		18	Netleaf Hackberry	Celtis reticulata	Seed
BL744	Shelter	25	Fragment	unknown	Seed
BL821	Colluvial loeslope	43		Indeterminable	Wood
BL834	Alluvial Terrace	46		Indeterminable	Wood
BL886	Shelter	45	Netleaf Hackberry	Celtis reticulata	Seed
		45	Live Oak Wood Type	Quercus sp.	Wood
CV1038	Alluvial Terracc	127	Live Oak Wood Type	Quercus sp.	Wood
CV1136	Alluvial Terrace	209	Live Oak Wood Type	Quercus sp.	Wood
CV1167	Toeslope Midden	75	Live Oak Wood Type	Quercus sp.	Wood
CV137	Alluvial Terrace	87	Netleaf Hackberry	Celtis reticulata	Seed
CV1391	Colluvial slope	147	Live Oak Wood Type	Quercus sp.	Wood
CV174	Alluvial Terracc	167	Live Oak Wood Type	Quercus sp.	Wood
	Alluvial Terracc	178	Hickory Wood Type	Carya sp.	Wood
CV95	Alluvium	129	Live Oak Wood Type	Quercus sp.	Wood
		152		Indeterminable	Wood
		147	Live Oak Wood Type	Quercus sp.	Wood
		127	Live Oak Wood Type	Quercus sp.	Wood
CV97	Alluvial Terrace	263	Live Oak Wood Type	Quercus sp.	Wood
		255	Ulmus sp.	Elm	Wood
		263	Live Oak Wood Type	Quercus sp.	Wood
		217	Live Oak Wood Type	Quercus sp.	Wood
		526	Live Oak Wood Type	Quercus sp.	Wood
		164	Live Oak Wood Type	Quercus sp.	Wood

Table G-2 Noncarbonized Plant Remains by Site and Field Sample Number.*

Site	Field No.	Taxon	Common Name	Part	Site	Field No.	Taxon	Common Name	Part
BL154B	99	Fragment	unknown	Seed	BL821	22	Quercus sp.	Oak Wood Type	Nut
BL154B	99		Indeterminable	Root	BL821	23	Herbivore	Herbivore	Feces
BL154B	113		Indeterminable	Wood	BL821	23	Quercus sp.	Oak	Nut
BL154B	124	Juniperus sp.	Juniper	Leaf	BL821	43	Opuntia sp.	Prickly Pear	Seed
BL154B	151	Galium sp.	Bedstraw	Seed	BL888	27	yper	Sedge Family	Seed
BL168	24	Juniperus ashei	Ashe Juniper	Leaf	BL888	27	Fragment	unknown	Seed
BL168	24	Juniperus sp.	Juniper	Wood	CV1085	28		Indeterminable	Root
BL168	39	Juniperus ashei	Ashe Juniper	Seed	CV1085	73		Indeterminable	Root
BL168	39	Juniperus sp.	Juniper	Wood	CV1085	77		Indeterminable	Root
BL168	71	Poaceac	Grass Family	Culm	CV1105	97	Galium sp.	Bedstraw	Seed
BL168	74	Quercus fusiformis	Plateau Liveoak	Nut	CV1105	97		Indeterminable	Root
BL339	216	Juniperus sp.	Juniper	Flower	CV1105	143		Indeterminable	Root
BL339	216	Poaceae	Grass Family	Flower	CV1105	158	Galium sp.	Bedstraw	Seed
BL339	225	Juniperus sp.	Juniper	Flower	CV1136	157	Juniperus ashei	Ashe Juniper	Leaf
BL339	226	Juniperus sp.	Juniper	Flower	CV1136	209	Juniperus ashei	Ashe Juniper	Leaf
BL433	18	Celtis reticulata	Netleaf Hackberry	Seed	CV1136	265	Fragment	unknown	Seed
BL433	18		Indeterminable	Root	CV137	74		Indeterminable	Stem
BL433	18	Juniperus ashei	Ashe Juniper	Seed	CV1391	121	Juniperus ashei	Ashe Juniper	Leaf
BL433	21		Indeterminable	Wood	CV174	128	Paspalum sp.	?	Seed
BL433	24	Juniperus ashei	Ashe Juniper	Seed	CV174	144	Galium sp.	Bedstraw	Seed
BL433	24	Juniperus ashei	Ashe Juniper	Leaf	CV174	144		Indeterminable	Bark
BL433	27		Indeterminable	Seed	CV174	144	Juniperus ashei	Ashe Juniper	Seed
BL433	30	Juniperus ashei	Ashe Juniper	Leaf	CV174	152	Juniperus sp.	Juniper	Leaf
BL433	33		Indeterminable	Root	CV95	127		Indeterminable	Seed
BL538	7	Prunus mexicana	Mexican Plum	Seed	CV95	127	Ulmus crassifolia	Cedar Elm	Leaf
BL538	52	Juniperus sp.	Juniper	Wood	CV95	147		Indeterminable	Leaf
BL564	32	Ampelopsis sp.	Pepper-vine	Seed	CV95	152		Indeterminable	Root
BL564	32	Croton sp.	Croton	Seed	CV95	174		Indeterminable	Root
BL564	32	Juniperus sp.	Juniper	Wood	CV960	175		Indeterminable	Seed
BL564	32	Poaceae	Grass Family	Seed	CV960	175		Indeterminable	Leaf
BL567	29	Celtis sp.	Hackberry	Seed	CV960	229		Indeterminable	Bark
BL567	30	Juniperus ashei	Ashe Juniper	Leaf	CV960	272		Indeterminable	Wood
BL568	30	Live Oak Wood Type	Quercus sp.	Nut	CV960	272		Indeterminable	Bark
BL744	25	Ampelopsis sp.	Pepper-vine	Seed	CV97	164	Fragment	unknown	Fruit
BL754	17	Vicia sp.	Milk vetch	Seed	CV97	164		Indeterminable	Root
BL754	20		Indeterminable	Wood	CV97	164	Live Oak Wood Type	Quercus sp.	Wood
BL765	12	Ampelopsis sp.	Pepper-vine	Seed	CV97	201	Celtis reticulata	Netleaf Hackberry	Seed
BL765	12	Herbivore	Herbivore	Feces	CV97	217	Ulmus crassifolia	Cedar Elm	Fruit
BL765	12		Indeterminable	Seed	CV97	238	Celtis reticulata	Netleaf Hackberry	Seed
BL765	12	Juniperus sp.	Juniper	Leaf	CV97	343	Juniperus ashei	Ashe Juniper	Leaf
BL821	22	Herbivore	Herbivore	Feces	CV97	531	Celtis reticulata	Netleaf Hackberry	Seed
					CV97	536	Celtis reticulata	Netleaf Hackberry	Seed

* All remains should be considered modern and intrusive.

uncarbonized evidence of oak, while 12 sites contained carbonized oak remains. If these apparent differences in oak/juniper concentrations hold up to further study, it would provide an interesting study in contrasting current/historic vegetation changes. The possibility exists that the inhabitants chose oak over juniper; however,

juniper has been a preferred firewood throughout much of its range, and it appears likely that the availability of juniper during the prehistoric period was lower than at present.

SITE ASSESSMENTS AND RECOMMENDATIONS

Table G-3 lists each site tested and whether it produced carbonized plant remains. Of the 26 sites studied, samples from eight sites yielded no carbonized macrobotanical remains. Based on the information available to me, these eight sites should be considered low priority sites in terms of macrobotanical recovery. The best archeobotanical record was recovered from 41BL433 and 41BL567, both shelters. Both of these shelters contained carbonized wood; 41BL433 contained pecan shell fragments and 41BL567 contained walnut fragments. The botanical evidence suggests that these shelters were occupied in the fall, and served as collecting/processing stations for nut resources available from late October-December. Whether they were occupied at other times of the years, and what other activities occurred, or the intensity of the nut processing/utilization is not clear from these few samples. Despite the fact that these are shelters, both sites contained abundant fresh seed and root remains, indicating that substantial biological activity was occurring in the shelter sediments. Other shelters which show promise for generating more macrobotanical data include 41BL754 and 41BL765, both of which yielded abundant carbonized wood remains but no seeds. 41BL886 also may produce a botanical record if they are sampled more intensively.

None of the samples from open sites contained seeds or nutshell fragments. The alluvial terrace sites 41CV95 and 41CV97 yielded substantial carbonized remains, although 41CV95 contained only live oak wood. Oak wood and hickory wood types were identified in 41CV174, which also showed potential for yielding carbonized plant remains. The rest of the open sites that produced some carbonized plant remains also may warrant further study.

The relatively rich non-carbonized macrobotanical assemblage should be considered an indication of substantial turbation. Therefore care should be taken in assessing the origin of all plant remains, even the carbonized material. At each site a few of-site samples should be analyzed in order to determine the nature of the natural seed rain. Was geomorphic context linked to success in the recovery of macrobotanical materials? Some contexts, such as the upland sites, yielded no carbonized material. Whether this is due to a sampling problem, or to the complete lack of carbonized material, is not easy to tell. Of the 18 productive sites, seven were shelters, and the best botanical records were recovered from shelter sites. Although the shelter sites yielded more varied plant remains, such as nutshell fragments, some of the open sites also produced substantial carbonized material. And 11 open sites yielded carbonized plant remains. My assessment is that geographic locations of the best producing sites from all geomorphic contexts should be sampled during the data recovery phase. At a minimum, sampling strategies designed to yield both extensive and intensive sampling should be implemented for 41BL433, 41BL567, 41CV95 and 41CV97 during subsequent excavation. If further excavation is recommended for any of the sites in Table G-3, these sites should be sampled and monitored for plant remains, because they have demonstrated a potential to yield carbonized plant material. Finally, the eight sites that did not yield carbonized material should be considered low priority sites for macrobotanical analysis. They should be checked closely during excavation, however, because some microenvironments favorable for preservation may be uncovered.

Table G-3 Sites Yielding Carbonized Plant Remains.

Site Number	Sample Location
41BL168	Shelter
41BL339	Alluvium
41BL433	Shelter
41BL567	Shelter
41BL744	Shelter
41BL754	Shelter
41BL765	Shelter
41BL821	Colluvial
41BL834	Alluvium
41BL886	Shelter
41CV95	Alluvium
41CV97	Alluvium
41CV137	Terrace midden
41CV174	Alluvium
41CV1038	Alluvium
41CV1136	Alluvium
41CV1167	Toeslope midden
41CV1391	Paluxy colluvium

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APPENDIX H

OBSIDIAN X-RAY FLUORESCENCE DATA

by
Frank Asaro and Fred Stoss

OBSIDIAN X-RAY FLUORESCENCE DATA

This is a report on the analysis of one obsidian flake recovered from heavy fraction sorting of site 41CV137. This flake was recovered from Test Pit 1, Level 7 (Cat number 1-37-249). The following report was compiled from a letter to Thomas R. Hester at The University of Texas at Austin from Frank Asaro and Fred Stoss (Lawrence Berkeley Laboratory, Berkeley, California).

The analyses were made by R. D. Giauque by the nondestructive PXRF procedure (Giauque et al., X-ray Spectrometry 22:44-53, 1993). The reference sample had been previously analyze by the same PXRF procedure. The precision of measurement of reliability, of PXRF can be expressed by a "pooled error," which is the average Coefficient of Variation found for triplicate measurements in 11 different homogeneous obsidian sources.

Table H-1 shows the element abundance data for a fragment labeled TOP 176. In addition are shown data for our Malad reference. The average deviation in abundances for nine well-measured elements is 3.8%, which seems a little high with an average pooled error of 2.8%. However, the match of many elements, especially the high abundance of Ba characteristic of the Malad source, strongly suggest a provenience of Malad for this sample. The deviations for Y and Fe may indicate a variation in abundances in the Malad source obsidian such as has been found in other apparently homogeneous sources. We assign a provenience of Malad to TOP176.

Table H-1 Comparison of Element Abundances in Sample TOP 176 (41CV137) with the Malad Source.*

Element	TOP 176	Malad Reference	TOP 176 Reference (-1%)	Pooled Errors (%)
Y	29.8	31.7	-6	1.8
Zr	90.9	87.6	3.8	2.2
Sr	71.4	73.2	-2.5	2.3
Rb	125.8	129.4	-2.8	2.4
Fe(%)	0.754	0.702	7.4	2.8
Ba	1,470	1,521	-3.4	2.8
K (%)	4.07	3.84	6	3.1
Zn	38.5	38.7	-0.5	3.4
Nb	19.6	19.2	2.1	4.5
Number of elements	9			
Average deviation	3.80%			
Average pooled error	2.80%			

Note: PXRF measurements by Robert D. Giauque.
Element abundances are in parts per million except for Fe and K which are in percentage, elements are given in order of increasing error.

APPENDIX I

CHERT TAXONOMY

SECONDARY CHERTS OCCURRING WITHIN THE BEDLOAD OF COWHOUSE AND TABLE ROCK CREEKS

Type 1	**Heiner Lake Blue - light colored outer part**
Occurrence:	Very large (often >1 m) disc-shaped nodules.
Color:	White to yellowish gray (N9 to 5Y 8/1). Some bands near the cortex are occasionally pale yellowish brown (10YR 6/2). Cortex is reddish brown (5YR 4/4 to 4/4).
Texture:	Medium to coarse. Freshly broken surfaces often have a chalky feel.
Structure:	Homogeneous to very faintly banded.
Translucency:	<1 mm.
Luster:	Dull.
Patination:	Unknown.
Results of heating:	Fracture surfaces are often smoother after heating, but this process has no apparent effect on luster. At low temperatures (ca. 300°F) no significant color change was observed. At 450°F the surface begins to redden slightly to a pinkish white (7.5YR 8/2), and by 550°F, the color change is more uniformly pink (5YR 7/4). At high temperatures (> 700°F) colors range between pink-pinkish gray (5YR 7/3 to 7/2), very light gray (N8), and light brownish gray (5YR 6/1).
Comments:	A relatively uniform but somewhat soft material. It occurs in very large pieces and emits a pronounced ring when struck with hammer or hammerstone. The interiors of the nodules upon which this material occurs are finer textured, occasionally brachiated, and described separately as Heiner Lake Blue (No. 10). As the name suggests, this material is found in the vicinity of Heiner Lake, most notably observed in the spoil of a pipeline which runs roughly east-west about 300 m north of Heiner Lake.

Type 2	**Cowhouse White**
Occurrence:	Large nodules, probably disc-shaped but most outcrop specimens are broken into smaller pieces (often <30 cm in diameter).
Color:	Predominantly white (N9, 10YR 8/1) and very light gray (N8), but may include gray - light gray (N7, N6), bluish white (5B 9/1), light gray, gray and light brownish gray (10YR 7/2, 10YR 6/2, and 10YR 5/1).
Texture:	Variable, fine to coarse, often appears porcellaneous.
Structure:	Prominently banded near cortex and mottled in center. A few specimens exhibit extensive mottling (ca. 1 cm tubular fills of different textured, usually coarser, pale yellowish orange [10YR 8/5] material) and most samples also exhibit numerous small (<1 mm) white to light gray flecks.
Translucency:	1.0 - 3.4 mm.
Luster:	Dull.
Patination:	White.
Results of heating:	At low temperatures (ca. 300°F) there is no significant color or luster change. At 450°F the luster increases slightly to medium, especially finer-textured material adjacent to the cortex, and a faint blush of grayish orange pink (10R 8/2) occurs on heated surface. By 550°F, a more uniform reddening of occurs and most pieces appear to be grayish pink to moderate pink (5R8/2 to 7/4), and the small flecks discolor more than surrounding matrix. Luster is irregular and ranges between dull and medium. At high temperatures (> 700°F) a more uniform medium luster occurs and the colors are slightly more intense pink than at 550°F.
Comments:	This chert does not have the chalky feel of type 1; it is also somewhat harder. It is the only prominently banded chert currently known from Fort Hood. It occurs in East Range, north of Cowhouse Creek, around Union Hill.

Type 3	**Anderson Mountain Gray**
Occurrence:	Irregularly shaped nodules, commonly < 40 cm in diameter.
Color:	In general, this chert becomes darker toward the center of the nodules, and ranges in color from white (N9 to 10YR 8/1) at the cortex, to pale yellowish brown (10YR 6/2), light gray (10YR 7/1, 7/2), very pale brown (10YR 7/4), medium dark gray (N4), olive gray (5Y 4/1), and brownish gray (5YR 6/1). Cortex is white and slightly rough, but may be stained light reddish brown (5YR 6/4).
Texture:	Fine to medium.
Structure:	Mottled, commonly exhibits many fine (<1 mm) darker mottles (inclusions) which are most prominent at edges of nodules; larger mottles (5+ mm diameter) are also common. Occasionally to frequently fossiliferous (gastropods and bivalves), and a few vugs with megaquartz are also present.
Translucency:	1 - 3 mm.
Luster:	Dull.
Patination:	Often a grayish red purple to brownish gray.
Results of heating:	Low temperatures (ca. 300°F) increase the luster slightly to medium, and a very faint pink occurs on the outside surface. At 450°F, there is no significant color change, but the luster is clearly increased to a medium, in excess of lower temperature state. Around 550°F, the exteriors change to a grayish pink (5R 8/2 to 7/2) but interior colors remain unchanged; luster increases to medium or shiny. High temperatures (> 700°F) turn exposed surfaces grayish orange pink (10R 8/2) and a more uniform medium to shiny luster is apparent.
Comments:	This material is greatly improved by heating. It occurs in the southwest part of Fort Hood, most notably on Anderson Mountain and Seven Mile Mountain. Some exposures north of Anderson Mountain have been observed, but mostly in secondary contexts adjacent to House Creek.

Type 4	**Seven Mile Mountain Novaculite**
Occurrence:	Very large (often >1m diameter), irregular very hard nodules with porous megaquartz cortex, often colored red due to adherence of old argillic horizon.
Color:	White to light gray (N7, N8) bluish gray (5B 6/1), and pale blue (5PB 7/2) with irregular veiniform very pale brown (10YR 7/4) inclusions which appear as yellow, somewhat linear mottles (10YR 7/6) in some samples. Often grades to a yellow or orange color at margins of nodules.
Texture:	Highly variable, fine to coarse, occasionally looks like a quartzite. Surface fractures often have a "sugary" appearance.
Structure:	Vein-like inclusions, occasionally look like mottles; otherwise, rather homogeneous.
Translucency:	>15 mm.
Luster:	Dull, but individual quartz crystals often lend specular highlights.
Patination:	White to pale yellow.
Results of heating:	Low temperatures (ca. 300°F) result in no significant color change but may increase luster to a medium and make fracture surface textures smoother. At 450°F the veins near surface begin to turn reddish yellow (5YR 6/6) and luster increases to medium. Around 550°F, a radical luster change occurs and some specimens change to medium or shiny, the latter of which are almost glassy. Colors are similar to 450°F. High temperatures (> 700°F) cause the veins to turn red (2.5YR 4/8) and same luster changes as 550°F.
Comments:	A very hard material in the raw state. However, finer-grained specimens experience a radical metamorphosis upon heating, especially at high temperatures that are deleterious to finer-grained cherts.

Type 5	**Texas Novaculite**
Occurrence:	Large nodules or unknown shape but in excess of 30 cm in diameter.
Color:	Light bluish gray (5B 5/1 to 7/1), pale yellowish brown (10YR 6/2), and white (10YR 8/1).
Texture:	Medium to fine.
Structure:	Common coarse (>10 cm diameter) mottles which exhibit sharp boundaries; often composed of slightly coarser textured material.
Translucency:	4-6 mm.
Luster:	Dull.
Patination:	Unknown.
Results of heating:	Low temperatures (ca. 300°F) cause fracture surfaces to be smoother, but no discernible color-luster change. Slightly higher temperatures (ca. 450°F) evoke a distinct increase in luster to medium. Around 550°F, the surface takes a very minimal blush (light gray to light pinkish gray - 5YR 7/1 to 7/2) and the luster is slightly greater than at 450°F. At temperatures in excess of 700°F, the color changes to gray-pinkish gray (5YR 6/1 to 6/2) and luster increases to medium-shiny.
Comments:	A hard material in the raw state. It crops out north of Owl Creek in East Range, but the extent of this material is unknown.
Type 6	**Heiner Lake Tan**
Occurrence:	Very disjointed nodular beds ranging between 10 and 20 cm thickness with occasionally very large nodules (>50 cm in diameter). Typical outcrop exposures have blocky chert fragments scattered in rather high density pavements.
Color:	Light gray to light brownish gray (10YR 7/2 to (creamy) white (10YR 8/2), and grayish orange (10YR 7/4). Common, prominent, round white to very pale orange (10YR 8/2-8/1) sharp-edged mottles which are often slightly coarser textured than surrounding matrix. Cortex is moderate orange pink (5YR 8/4).
Texture:	Medium to fine; cortex is coarser textured and often a little chalky to touch.
Structure:	Mottled; the common small (<1-5 mm), round white to very pale orange mottles are diagnostic of this type. Some samples are very crudely banded with a few concentric color bands roughly parallel to and within 5 mm of the nodule surface.
Translucency:	1-5 mm.
Luster:	Dull.
Patination:	Unknown.
Results of heating:	Low temperatures (ca. 300°F) evoke a light blush on heated surfaces (grayish pink, something less than 5R 8/2), and a low-end, medium luster. At 450°F, the surface discoloration is more uniform and of the same color as previously mentioned; the luster is also more uniformly increased to medium. Slightly higher temperatures (e.g. 550°F) cause the heated surfaces to become moderate red to red (5R 5/4 to 2.5YR 5/6) but interiors are mostly unchanged in color with a medium to shiny luster. High temperatures (> 700°F) cause thermal fractures (pot lids) to occur and the color to change to medium gray (N5); luster is similar to 550°F.
Comments:	The mottles are a diagnostic attribute of this chert.
Type 7	**Fossiliferous Pale Brown**
Occurrence:	Probably irregularly shaped nodules.
Color:	Very pale brown (10YR 6/4 to 7/4) , light gray to white (10YR 7/2 to 10YR 8/2), and mottled to gray-light gray (10YR 6/1). Pale blue (5PB 7/2; 5B 9/1) flecks and veins are common in some specimens. Cortex is white (N9) but often stained dark brown (7.5YR 4/2) or reddish brown (5YR 4/4) by the surrounding soil.
Texture:	Fine to medium.

Structure:	Mottled, and most specimens exhibit numerous fossils, and vein-like, possibly chalcedonic, inclusions.
Luster:	Dull.
Patination:	Unknown.
Results of heating:	Unknown.
Comments:	This material is known from several sites at Fort Hood (e.g. quads 16/51, 31/50 and 34/51), but more field work is necessary to confirm it as a distinctive type of chert.

Type 8	**Fort Hood Yellow**
Occurrence:	Large, irregular nodules, often in excess of 30 cm in diameter.
Color:	Very pale brown to (10YR 6/2 to 10YR 7/3) varies to light gray, light gray (10YR 7/1, 10YR 5/1, the latter of which most commonly occur as mottles or bands that are coarser textured than the brown parts. Cortex is generally white to moderate yellowish brown (10YR 5/4).
Texture:	Brown samples are generally fine textured whereas the gray colored mottles and inclusions are often medium or coarse textured.
Structure:	Mottled with few to common sharp edged, often very irregular shapes (often look like burrows) which are up to 1 cm diameter. Some mottles have distinctly different color band around mottles, often gray, and the majority of the mottles are a coarser texture than the surrounding matrix.
Translucency:	<1.5 mm.
Luster:	Medium to dull.
Patination:	Yellow to white.
Results of heating:	Low temperatures (ca. 300°F) cause a minimal change in luster and no color change. At 450°F, the outer surfaces become light reddish brown (5YR 6/3) in a thin (<0.5 mm) rind, and the luster increases to a low end medium. Exposure to temperatures of approximately 550°F turn the surface a pale red (5R 7/2) and the luster turns medium to shiny, whereas exposure to high temperatures (> 700°F) causes pot lids and a significant reddening of the surface, weak red to dark reddish gray (10R 6/3 to 10R 4/1) colors pervade material, and luster becomes medium to shiny.
Comments:	The most ubiquitous chert at Fort Hood, the outcrop of which extends across much of the north half of the base. Results of the shovel testing suggest this was the most commonly used material in this region, although not necessarily the most preferred material.

Type 9	**Heiner Lake Translucent Brown**
Occurrence:	Tabular to squatty disc-shaped nodules, often with thin laminae weathered into bas-relief striations on nodule surface.
Color:	Dark gray to dark grayish brown (10YR 4/1, 10YR 3/1, 10YR 3/2), pale yellowish brown (10YR 6/2), and occasionally grayish brown (10YR 5/2). Light bluish gray and brown (10YR 4/4) laminae occasionally present. Cortex is white and generally thin to light yellowish brown (10YR 6/6).
Texture:	Fine.
Structure:	Laminated to striated, typically exhibits many thin (<1 mm) laminae parallel to long axes of nodules (horizontal), which occasionally act as cleavage planes. Few to many of these laminae are discontinuous, white, irregular blocks and are often 1-4 mm thick.
Translucency:	9 -12 mm.
Luster:	Medium to dull.
Patination:	White.
Results of heating:	No significant changes occur at low temperatures (ca. 300°F) but at 450°F, a shiny luster appears but no color change is observed. Slightly higher temperatures, (e.g. 550°F)

evoke a greater luster, shiny but almost glassy, and a slight reddening with reddish brown (2.5YR 4/4) the dominant color. High temperatures (> 700°F) cause thermal fractures, the colors become darker (very dusky red purple (5RP 2/2) to dark gray (5YR 4/1)) and luster is about the same as 550°F.

Comments: This is a unique chert for the region. The striations are easily diagnostic, but it is also the only translucent brown chert currently known on base. The luster change upon heating is impressive. The tendency of this chert to break upon striations (in a cleavage manner) makes working with it challenging. As the name implies, it occurs around Heiner Lake in the southeastern part of Fort Hood.

Type 10 **Heiner Lake Blue**

Occurrence: Found at the center of very large (often >1 m) disc-shaped nodules.

Color: Medium gray (N5) to medium bluish gray (5B 5/1). Common white (10YR 8/1) to light gray (10YR 7/2) gray 0.5 to >2 cm mottles, and few to many <1 mm bluish white (5B 9/1) flecks.

Texture: Fine.

Structure: Mottled to brachiated near margins with type 1 material.

Translucency: 3-5 mm.

Luster: Dull to medium.

Patination: White.

Results of heating: Low temperatures (ca. 300-450°)) cause the luster to increase to medium-shiny, but does not cause a color change. Around 550°F, the surface began to change to a pinkish gray (5R 7/2) but the luster is still a medium-shiny. High temperatures (> 700°F) cause pot lids, but the luster increases to shiny. Discoloration remains a pinkish gray.

Comments: This chert occurs at the centers of nodules which have type 1 on the outside. Although we are not certain that this is what J.B. Sollberger was calling Heiner Lake Blue, we decided to adopt the name because it is some of the only material in this region that could be construed to be of a blue color. It is rather hard and often appears to be brachiated around the margins where it grades into type 1.

Type 11 **East Range Flat**

Occurrence: Irregular nodules, often with hollow center voids or chalky burrows.

Color: Gray-light gray (N6 - N7) to light (olive) gray (2.5Y 7/2 to 5Y 7/2); colors often shade from one into another. It is commonly gray outside and shades to olive gray inside nodules. Cortex is white, yellowish brown (10YR 5/4) and very pale orange (10YR 8/2).

Texture: Medium.

Structure: Streaked (elongate mottles) and mottled, few 1-2 cm diameter mottles of coarser textured sediment. Some specimens have many, <1 mm dark gray mottles (or flecks). Surface often feels rather chalky.

Translucency: <1 mm.

Luster: Dull, very flat in appearance.

Patination: Unknown.

Results of heating: At low temperatures (ca. 300-550°F) the surface changes to a pale red (10R 6/3) and the luster increases to medium. High temperatures (> 700°F) change the luster to medium and occasionally shy, and the heated surfaces become pale red (10R 6/3). High temperature heat treating and subsequent breakage evokes a strong petroleum odor.

Comments: Although some of the colors are similar to GBG and Ft. Hood Gray, this chert has a very dull luster, chalky feel, small flecks, and seems somewhat softer. It occurs along the south Owl Creek valley wall in several small canyons.

Type 13	**East Range Flecked**
Occurrence:	Thin (< 10 cm) tabular nodules which are often fractured into tabular fragments in the outcrop.
Color:	Dark gray (N4) to light gray (N7 to 10YR 5/1) and the colors shade from light gray at outside of nodules to dark gray in interiors. The cortex is white (N9) and there are a few very pale orange (10YR 8/2) mottles. Many fine (< 1 mm) white to bluish white (inclusions) are present.
Texture:	Fine to medium.
Structure:	Mottled to shaded. Many to common, small (< 1 mm), white flecks which exhibit some preferred orientation (fabric), some of which are fossils; occasionally mottled with coarser textured (medium to coarse, dull, opaque gray material).
Translucency:	< 1 mm.
Luster:	Mostly dull, although dark, finer-textured material may be medium.
Patination:	White.
Results of heating:	No visible changes occur at low temperatures (ca. 300°F), but around 450°F, the coarser textured mottles and cortex turn weak red (1010R 5/2) and the luster increases to medium, especially the darker, finer-textured parts. At high temperatures (> 700°F), this chert experiences severe thermal fractures (pot lids) and the luster increases to medium-shiny. No interior color change was noted but the cortex changed to pale red (10R 6/3).
Comments:	Darkest colors of this chert overlap with lighter colors of Owl Creek Black but the inclusions associated with this material are much more prominent. The outcrop of this material is currently known to be very limited, located at the eastern end of the Fort in quad 41/48, adjacent to Belton Lake. The size of nodule fragments and the presence of internal fractures is a limiting factor in using this material, but a procurement site in the outcrop belt confirms aboriginal use.

Type 14	**Fort Hood Gray**
Occurrence:	Irregular nodules that may exceed 50 cm in long axis and 30 cm in thickness.
Color:	Variable, light gray to dark gray (N7 to N4), and occasionally medium bluish gray (5B 5/1). The cortex may be white to very light gray (N8-N9) and occasionally varies to grayish brown (2.5Y 5/2). Some fracture surfaces and burrow traces within chert are stained dark brown to strong brown (7.5YR 4/4 to 5/6).
Texture:	Fine, but mottles occasionally coarser than matrix.
Structure:	Mottled with few to common irregular tubular mottles approximately 1 cm diameter and of slightly different color and/or textured material; larger-scale color mottling was also apparent.
Translucency:	<3 mm.
Luster:	Usually dull, but infrequently medium.
Patination:	Often a deep purple-brown color (not on Munsell), and occasionally white.
Results of heating:	Low temperatures (ca. 300°F) cause some mottles to turn weak red (5Y 4/2) and the luster increased to medium. Heating to 450-550°F causes a change in luster to medium and in some cases shiny. High temperatures (> 700°F) result in thermal fractures (1-2 cm diameter pot lids), but the luster is shiny to medium. No dramatic color changes were evident in most specimens.
Comments:	Crops out near GBG in the northern part of East Range, has similar mode of occurrence, coloration and structure. Sometimes difficult to distinguish from GBG.

Type 15	**Gray-Brown-Green**
Occurrence:	Irregular nodules (40+ cm diameter).
Color:	Light brownish gray-grayish brown (2.5Y 6/2 - 5/2), light olive gray (5Y 5/2), gray (10YR 6/1) to very dark gray (N3). Some light olive gray mottles (5Y 6/1) grade to light gray (N7). The cortex is white (N9) to yellowish gray (5Y 8/1) and chalky.
Texture:	Fine.
Structure:	Mottled with medium to coarse (2-20+ mm) inclusions of variable colored and textured material. Mottles are often slightly coarser textured than the surrounding matrix. A few vugs filled with mega quartz are present.
Translucency:	Usually <1 mm.
Luster:	Medium to dull.
Patination:	Unknown.
Results of heating:	Low temperatures (ca. 300°F) cause no visible changes, but at 450°F, the luster increases to medium and a very light blush occurs on heated surfaces (10R 6/2 - pale red). At 550°F, a similar discoloration occurs, but the luster often becomes shiny.
Comments:	This material occurs in East Range north of Owl Creek and is very closely related to Fort Hood gray and probably Owl Creek Black as well.

Type 16	**Leona Park**
Occurrence:	Massive bedded chert, in excess of 50 cm thick in places. Weathers into large rhombohedral blocks along joint planes.
Color:	Irregularly mottled with dark gray (N3), medium gray (N5), very light gray (N8), and light brownish gray (5YR 6/1). Joint faces are stained dark yellowish brown (10YR 6/6). There is no appreciable cortex.
Texture:	Fine to medium.
Structure:	Difficult to describe. There is a definite fabric present that is roughly parallel to bed boundaries, and the mottles (alternating, mixed gray and light gray colors) are horizontally elongated. Very reminiscent of lenticular bedding.
Translucency:	<1 mm.
Luster:	Dull, but occasionally medium.
Patination:	Unknown.
Results of heating:	Low temperatures (ca. 300°F) cause a minor luster change and evoke a minor petroleum odor, but exposure to temperatures around 450°F results in a definite increase in luster, and changes the yellow joint planes to a weak red (2.5YR 4/2). Slightly higher temperatures (ca. 550°F) have a similar effect, but the luster is slightly greater. High temperatures (> 700°F) make the freshly broken surface luster shiny, joint planes red (5R 5/4), and broken pieces quite smelly.
Comments:	Occurs outside the boundary of Fort Hood in Leona Park, east side of Belton Lake, just north of Highway 36. Freshly broken heated specimens emit an intense petroleum odor (sort of kerogen-like), similar to, but much more intense than, burned limestone.

Type 17	**Owl Creek Black**
Occurrence:	Thin (<6 cm) tabular nodules.
Color:	Black (N1) to dark gray (N4 to N2). Some specimens have <2 cm diameter, elongate medium light gray (N6) sharp-edged mottles. Many tiny (usually <0.5 mm) white flecks with a preferred orientation are present. The cortex is a white (N9) to reddish yellow (7.5YR 7/6) chalky material.
Texture:	Fine.
Luster:	Medium to shiny.
Structure:	Mottled to homogeneous. The tiny white inclusions express a horizontal fabric (parallel to long axes of the nodule).

Translucency:	<1 mm.
Patination:	white.
Results of heating:	Low temperatures (ca. 300°F) result in a minimal luster increase and change the chalky cortex to yellow (10YR 8/6). Slightly higher temperatures (ca. 450°F) evoke a distinct increase in luster to shiny and are still knappable, but all higher temperatures (550° > 700°F) cause extensive thermal fractures (pot lids) which decreased in size with temperature.
Comments:	Probably the most preferred chert in the region. In the outcrop a few extreme pieces were observed. One occurred as large, irregular fragments that had a dull luster, medium texture, and were a mottled gray to light gray (10YR 5/1 to 10YR 6/1). The mottles appeared to be irregularly laminated with arc-shaped, discontinuous, and often nested shapes which appear similar to mollusk burrow traces.

Type 18	**Cowhouse Two Tone**
Collection Locality:	Gravel bar in the active channel of Cowhouse Creek, Quad 6/61, immediately adjacent to the western edge of Fort Hood.
Occurrence:	channel gravel
Color:	Two tone chert which is achromatic gray (N6) to gray (10YR 5/1) around the cobble exterior, and grades into a very dark gray (10YR 3/1) with purple overtones in the nodule centers. The color change may be gradual or fairly abrupt. Cortex is yellowish brown (10YR 5/8) to brown (7.5YR 5/4).
Texture:	Mostly fine, but becomes medium immediately adjacent to the cortex.
Structure:	Shaded to mottled, although the color change which occurs from exterior to interior forms a very large scale mottle. A few small (ca. <1cm) diameter light gray (10YR 7/2) mottles occur throughout.
Translucency:	2.85-4.5 mm; average value is 3.5 mm
Luster:	Primarily dull, although some finer textured pieces exhibit a medium luster.
Patination:	Unknown
Effects of Heating:	Unknown
Comments:	The most common chert in the Cowhouse Creek bedload. It easily accounted for more than half of the material sampled from this stream. Fine textured specimens are similar in appearance to some examples of the Texas Novaculite (Type 5 of Frederick and Ringstaff 1994).

Type 19	**Cowhouse Dark Gray**
Collection Locality:	Gravel bar in the active channel of Cowhouse Creek, Quad 6/61, immediately adjacent to the western edge of Fort Hood.
Occurrence:	Channel gravels
Color:	Achromatic gray to very dark gray (N5 to N3). A thin band of very pale brown (10YR 8/3) occurs immediately adjacent to the brown (7.5YR 5/4) cortex.
Texture:	Primarily fine, although some mottles medium.
Structure:	Mottled. Few to common, small (<1 cm to >5 cm), round to irregular shaped mottles. A few tabular shaped mottles of slightly coarser textured chert also present. Mottles are generally lighter value than surrounding matrix and occasionally slightly coarser texture. Numerous very small (less than 1 mm) round to elongate, pale bluish white inclusions, that are probably microfossils.
Translucency:	0.8-2.7 mm; average value of 1.55 mm
Luster:	Medium to dull
Patination:	White
Effects of Heating:	Unknown

Comments: A relatively common component of the Cowhouse bedload. Darker specimens resemble Owl Creek Black (OCB, Type 17), but in general terms, this chert is more mottled, lighter gray, and occurs in large fragments than OCB.

Type 20 **Cowhouse Shell Hash**

Collection Locality: Gravel bar in the active channel of Cowhouse Creek, Quad 6/61, immediately adjacent to the western edge of Fort Hood.

Occurrence: Channel gravels

Color: Matrix is white to light gray (10YR 8/1 to 7/1). Many small (1 x 5 mm) arcuate shaped, pale bluish white shell fragments About 10% of the shell fragments have been replaced with brown to dark yellowish brown (10YR 5/3 to 4/4) sparry calcite which effervesces strongly with dilute hydrochloric acid (HCl). Cortex is brown to strong brown (10YR 5/4 to 5/6).

Texture: Medium

Structure: Fossiliferous. Otherwise relatively homogeneous.

Translucency: 1.5-3.9 mm; average value of 2.8 mm

Luster: Matrix is dull. The sparry calcite replaced shells add specular highlights to fracture surfaces.

Patination: Unknown.

Effects of Heating: Unknown.

Comments: Description is based upon a single large cobble. However, this material is very distinctive and clearly different from any other chert observed in either the Cowhouse bedload or known bedrock sources.

Type 21 **Cowhouse Light Gray**

Collection Locality: Gravel bar in the active channel of Cowhouse Creek, Quad 6/61, immediately adjacent to the western edge of Fort Hood.

Occurrence: Channel gravels.

Color: Light gray to gray (10YR 6/1 to 7/1). Cortex is brown to strong brown (7.5YR 5/4 to 5/6) and the chert immediately adjacent to the cortex grades from light gray to light yellowish brown (10YR 6/4).

Texture: Medium

Structure: Homogeneous to very faintly mottled. A few, clear to light bluish white, tubular to arcuate shell shaped quartz vug fills are present.

Translucency: 1.0-2.8 mm; average value of 1.75 mm

Luster: Dull

Patination: Unknown

Effects of Heating: Unknown

Comments: Resembles a micrite but is actually silicified, perhaps a silica replaced micrite.

Type 22 **Cowhouse Mottled with Flecks**

Collection Locality: Gravel bar in the active channel of Cowhouse Creek, Quad 6/61, immediately adjacent to the western edge of Fort Hood.

Occurrence: Channel gravel, although bedrock source is probably an irregular shaped nodule.

Color: Large cobbles of this chert have a two-tone appearance where the nodule center is darker that the material adjacent to the cortex. Colors grade from a light brownish gray to pale brown (10YR 6/2 to 6/3) near the cobble cortex to dark gray (10YR 4/1) in the center. The change in color may be gradual or abrupt, and tends to parallel the cortex A few coarser textured round mottles are present and these are often color zoned as well. The outer parts of these mottles are white (10YR 8/1) and change abruptly to an achromatic gray at the center of the mottle (N5-N6). Perhaps the most diagnostic attribute of this

chert are the numerous small (1-3 mm) round to irregular shaped white to light gray (10YR 8/1-7/1) mottles which are of similar texture to the matrix, and scattered through out the chert. The cortex is yellowish brown to brown (10YR 5/6 to 7.5YR 5/4).

Texture:	Fine, although some mottles are medium to coarse texture.
Structure:	Mostly mottled, although some banding is occasionally present immediately adjacent to the cortex..
Translucency:	1.76-4.54 mm; average value is 3.0 mm
Luster:	Dull to medium
Patination:	Unknown
Effects of Heating:	Unknown
Comments:	This chert is similar in appearance to Heiner Lake Tan (Type 6 of Frederick and Ringstaff 1994) but unlike it, this chert has a prominent two-toned mottling. Small flakes of this chert may be indistinguishable from Heiner Lake Tan.

Type 23	**Cowhouse Banded & Mottled**
Collection Locality:	Gravel bar in the active channel of Cowhouse Creek, Quad 6/61, immediately adjacent to the western edge of Fort Hood.
Occurrence:	Channel gravels.
Color:	Like Type 18, this material is dominated by two major colors, which are achromatic light gray (N7-N6) and achromatic gray-dark gray (N4-N5). A thin (<5 mm) band of very pale brown (10YR 7/3-7/4) lies immediately adjacent to the nodule cortex, which is brown-dark brown (7.5YR 4/4). A few, irregular shaped, small (<5 mm) very dark gray to almost brownish purple mottles are present, as are small (<7 mm) coarser textured light gray (10YR 6/1) mottles. Bands are 1-5 mm wide, alternate light and dark colors, and cut across the two-tone shading. A few tiny (<1 mm), clear quartz filled vugs are present in some specimens.
Texture:	Fine
Structure:	Banded to mottled, and often both.
Translucency:	1.8-2.9 mm; average value is 2.3 mm
Luster:	Dull
Patination:	Unknown
Effects of Heating:	Unknown
Comments:	This chert is similar in appearance to Type 18 Cowhouse Two Tone, but exhibits prominent banding which lacking in that material, and has fewer brown hues. They may be the same bedrock source but the lack of prominently banded cherts in most of the Fort Hood Taxonomy prompted us to consider this a distinct material type. Colors are faintly reminiscent of Fort Hood Gray (Type 14 of Frederick and Ringstaff 1994) but this chert is less mottled and banded.

Type 24	**Cowhouse Fossiliferous Light Brown**
Collection Locality:	Gravel bar in the active channel of Cowhouse Creek, Quad 6/61, immediately adjacent to the western edge of Fort Hood.
Occurrence:	Channel gravels
Color:	Ranges from light gray-light brownish gray (10YR 6/1 to 6/2) to gray-grayish brown (10YR5/1 to 5/2). Framework grains are primarily shell fragments that have been replaced by chalcedony and are light bluish gray to bluish white (5B 7/1 to 9/1). A few large shell fragments have been replaced by brown-dark brown (7.5YR 4/4) sparry calcite). Cortex is yellowish brown (10YR 5/6), and a few 1-2 cm diameter coarse textured two-tone mottles are also present. The outer rim of these mottles are white to light gray (10YR8/1-7/1) and some exhibit a dark gray (10YR 4/1) core.

Texture:	Medium to fine, but granular texture of original sediment makes this chert look coarser textured than it actually is.
Structure:	Relatively homogeneous with a few mottles, but the relict bedding of the original sediment imparts a pronounced horizontal fabric to some specimens.
Translucency:	3.6-7.4 mm; average value is 5.2 mm
Luster:	Dull to medium
Patination:	Unknown
Effects of Heating:	Unknown
Comments:	Homogeneous pieces may be confused with the Texas Novaculite (Type 5 of Frederick and Ringstaff 1994) which this material resembles. This chert may be distinguished on the basis of the numerous light bluish white chalcedony replaced shell fragments that are uncommon constituents of Texas Novaculite.

Type 25	**Cowhouse Brown Flecked**
Collection Locality:	Gravel bar in the active channel of Cowhouse Creek, Quad 6/61, immediately adjacent to the western edge of Fort Hood.
Occurrence:	Channel gravels
Color:	Dominant color is light brownish gray (10YR 6/2) but may also be brown (10YR 5/3). The most diagnostic attributes are the common, small (<1mm), spherical to tubular white inclusions which occur randomly throughout, and the occasional, small (1-5 mm) diffuse edged, brown (7.5YR 5/4) mottles. A few, coarser textured, 3-15 mm diameter mottles of light gray (10YR 7/1) chert are present in some specimens.
Texture:	Fine
Structure:	Homogeneous to mottled. Overall appearance is homogeneous light brown with faint brown spots and white flecks.
Translucency:	3.1-5.0 mm; average value is 3.4 mm
Luster:	Medium
Patination:	Unknown
Effects of Heating:	Unknown
Comments:	One of the finest textured, homogenous, and most lustrous materials observed in the Cowhouse bedload. It is similar in appearance to some forms of Fossiliferous Pale Brown and Fort Hood Yellow (Types 7 and 8 of Frederick and Ringstaff 1994) which lack the flecks and brown mottles but are of similar texture, luster and color.

Type 26	**Cowhouse Streaked**
Collection Locality:	Gravel bar in the active channel of Cowhouse Creek, Quad 6/61, immediately adjacent to the western edge of Fort Hood.
Occurrence:	Channel gravels, but structure and appearance suggest a tabular or disc shaped nodule bedrock habit.
Color:	Streaked various colors, the most common are achromatic dark gray (N4), pale brown (10YR 6/3), gray (10YR 5/1), and dark brown (7.5YR 3/4). Nearly all colors include varying proportions of very small (<1mm) dark brown (7.5YR 3/4) flecks that when present in high density appear to be dark brown bands. A few coarser textured, small to medium (3-20 mm diameter) gray to light gray (10YR 6/1) mottles are present as well.
Texture:	Fine.
Structure:	Streaked or banded, although some sections appear laminated (vestigial ripple laminations or other form of bedding structures).
Translucency:	1.3-2.7 mm; average value is 1.8 mm
Luster:	Dull to medium
Patination:	Unknown
Effects of Heating:	Unknown

Comments: Very distinctive chert. The only other cryptocrystalline silicate similar to this currently known from Fort Hood is Heiner Lake Translucent Brown (Type 9 of Frederick and Ringstaff 1994) and it is very different in appearance, especially in color and diaphaneity. In small flakes the streaks could be mistaken for bands.

Type 27 **Cowhouse Novaculite**

Collection Locality: Gravel bar in the active channel of Cowhouse Creek, Quad 6/61, immediately adjacent to the western edge of Fort Hood.

Occurrence: Channel gravels

Color: Gray to light gray (N6-N7), light bluish gray (5B 7/1), and light brownish gray (10YR 6/2). Coarser textured samples have many dark gray to black opaque coarse sand grains. Cortex color ranges from light yellowish brown (10YR 6/4) to yellowish brown (10YR 5/6) and white (10YR 8/2).

Texture: Coarse to medium

Structure: Faintly and coarsely streaked

Translucency: 3.2-9.9 mm; average value is 6.5 mm

Luster: Dull. Fresh fractures often have a rough, "sugary" appearance.

Patination: Unknown

Effects of Heating: Unknown

Comments: Bears some resemblance to Texas Novaculite (Type 5 of Frederick and Ringstaff 1994) but is coarser texture.

Type 28 **Table Rock Flat**

Collection Locality: Bedload of Table Rock Creek in Quad 3/55, where this creek enters the west side of Fort Hood.

Occurrence: channel gravels

Color: Dominant color is light gray (19YR 7/2), which grades to very pale brown (19YR 7/3), yellowish brown (10YR 5/6) and brownish yellow (10YR 6/8) near the cobble cortex. A few coarse textured abrupt edged gray to dark gray (10YR 5/1 to 4/1) mottles occur in cobble centers. White to light gray (10YR 8/2 to 7/2) mottles of similar texture to surrounding chert are also common in nodule centers.

Texture: The majority of this chert is medium to fine textured, but there is a pronounced gradient to medium textured material towards the cobble cortex which is usually yellow-brown to brownish yellow in color, poorly silicified and has a chalky feel even though it does not react with hydrochloric acid.

Structure: Mottled. Two types of mottles are present: 1) the most common mottles are irregular in pattern and shape, lighter colored, and are similar in texture to surrounding matrix.; 2) less common are round, abrupt edged, darker colored coarse textured mottles. Some cortical fragments are poorly silicified and intricately mottled shades of yellow and white, and appear almost dendritic in places.

Translucency: 0.6-1.9 mm; average value is 1.3

Luster: Dull

Patination: Unknown

Effects of Heating: Unknown

Comments: This is the only material observed in the bedload component of Table Rock Creek, and it comprised much less than 1% of the chert in these deposits. We looked for close to half an hour and found only six cobbles, the majority of which were almost too small to work.

APPENDIX J

FIELD FORMS

field done? Y N : QC checked? Y N

FORT HOOD ARCHAEOLOGICAL PROGRAM

PROFILED? yes / no

1993-1994 NRHP Testing
Excavation Level Record

Site: ____________ subarea: ____________
Test Pit: ____________ Level: ____________
Recorder: ____________ Date: ____________

PROVENIENCE DESIGNATION

Main PNUM: ________
Other PNUM: __________ describe: ______________
Other PNUM: __________ describe: ______________

ELEVATION cmbd/cmbs	NW	SW	SE	NE
Starting Depth				
Ending Depth				

** Circle pit datum corner above & on plan

SUMMARY OF LEVEL:

PLAN VIEW

TECHNIQUES: arbitrary cultural natural comments: ____________________
pick/shovel shovel trowel comments: ____________________
1/4" screen 1/8" screen comments: ____________________

OBSERVATIONS

Soil Texture: ______________________ Color: ______________________
Feature: none Fea.# __________ Type: ______________________
Charcoal: none flecks chunks // feature non-feature
Disturbance: none root rodent erosion vandal. other: __________

ROCK

Burned Rock: ________ pieces; ___________ kg
Other Rock: ________ pieces; ___________ kg
comments

ARTIFACTS (type)	Total	Comments (give PNUM if different than level)
lithic tools		ID types:
lithics		material:
bone		ID specimens:
shell		types:

SAMPLES	Feature#	Comments (give PNUM if different than level)

PHOTOGRAPHS (include video)	film	roll #	shot #	direct.	subject

ORM 8 - version 2.3 (8/93)

field work done? Y N : QC checked? Y N

FORT HOOD ARCHAEOLOGICAL PROGRAM

1994-1995 NRHP Testing
Excavation Level Record

SITE: ____________ subarea: ____________
Test Pit: ____________ Level: ____________
Recorder: ____________ Date: ____________

PROVENIENCE DESIGNATION
Main PNUM: ________
Other PNUM: __________ describe: ____________
Other PNUM: __________ describe: ____________

ELEVATION cmbd/cmbs	NW	SW	SE	NE
Starting Depth				
Ending Depth				

*** Circle pit datum corner above & on plan*

PLAN VIEW

SUMMARY OF LEVEL:

TECHNIQUES: arbitrary cultural natural comments: ____________
pick/shovel shovel trowel comments: ____________
1/4" screen 1/8" screen comments: ____________

OBSERVATIONS
Soil Texture: ____________ Color: ____________
Feature: none Fea.# ________ Type: ____________
Charcoal: none flecks chunks // feature non-feature
Disturbance: none root rodent erosion vandal. other: ________

ROCK
Burned Rock: ________ pieces; ________ kg
Other Rock: ________ pieces; ________ kg
comments

ARTIFACTS (type)	Total	Comments *(give PNUM if different than level)*
lithic tools		*types?*
lithics		*material?*
bone		*taxa/elements?*
shell		
historic		*types?*
military/recent		*(do not collect)*

SAMPLES	Feature#	Comments *(give PNUM if different than level)*
charcoal		*amount, size?*
flotation		*volume?*

PHOTOGRAPHS	film	roll #	shot #	direct.	subject
(include					
video)					

PROFILED? yes / no
OTHER COMMENTS

FORT HOOD ARCHAEOLOGICAL PROGRAM

1993-1994 NRHP TESTING

Field Catalog

SITE NO.: ________ Recorder: ______________ Date: __________

P#	PROVENIENCE HORIZONTAL	PROVENIENCE VERTICAL	CONTENTS	COUNT	COMMENTS

FORT HOOD ARCHAEOLOGICAL PROGRAM

1993-1994 NRHP Testing

Artifact Frequency Distribution

SITE NO.: ____________________ page ___ of ___

Testing dates: ____________________. Crew chief: ______________________

For each test pit, tabulate artifact frequency (from field catalog) by artifact class (columns) and depth (rows). Use zero (0) for none. Use final column under each test pit for other artifacts (note type). Use "+" for items present (per level notes) but not counted. Note counts which include a temporal diagnostic with "*". Note bottom of each pit with a heavy horizontal line. Circle entire level for a test pit if a feature is present. Attach additional sheets as necessary.

	TP#___					TP#___					TP#___					TP#___				
cmbs↓	L	B	S	R		L	B	S	R		L	B	S	R		L	B	S	R	
0-10																				
10-20																				
20-30																				
30-40																				
40-50																				
50-60																				
60-70																				
70-80																				
80-90																				
90-100																				
100-110																				
110-120																				
120-130																				
130-140																				
140-150																				
150-160																				
160-170																				
170-180																				
180-190																				
190-200																				

L = Lithic; B = Bone; S = Shell (bivalve); R = Rock (burned).

FORT HOOD ARCHAEOLOGICAL PROGRAM

1993-1994 NRHP Testing

Artifact Frequency Distribution - page 2

SITE NO.: ____________________ page ___ of ___

Testing dates: ____________________. Crew chief: ____________________

For each test pit, tabulate artifact frequency (from field catalog) by artifact class (columns) and depth (rows). Use zero (0) for none. Use final column under each test pit for other artifacts (note type). Use "+" for items present (per level notes) but not counted. Note counts which include a temporal diagnostic with "*". Note bottom of each pit with a heavy horizontal line. Circle entire level for a test pit if a feature is present. Attach additional sheets as necessary.

	TP#____					TP#____					TP#____					TP#____				
cmbs↓	L	B	S	R		L	B	S	R		L	B	S	R		L	B	S	R	
200-210																				
210-220																				
220-230																				
230-240																				
240-250																				
250-260																				
260-270																				
270-280																				
280-290																				
290-300																				
300-310																				
310-320																				
320-330																				
330-340																				
340-350																				
350-360																				
360-370																				
370-380																				
380-390																				
390-400																				

L = Lithic; B = Bone; S = Shell (bivalve); R = Rock (burned).

FORT HOOD ARCHAEOLOGICAL PROGRAM
1993-1994 NRHP Testing

Artifact Frequency Distribution - page 3

SITE NO.: ___________________ page ___ of ___
Testing dates: ___________________. Crew chief: ______________________

For each test pit, tabulate artifact frequency (from field catalog) by artifact class (columns) and depth (rows). Use zero (0) for none. Use final column under each test pit for other artifacts (note type). Use "+" for items present (per level notes) but not counted. Note counts which include a temporal diagnostic with "*". Note bottom of each pit with a heavy horizontal line. Circle entire level for a test pit if a feature is present. Attach additional sheets as necessary.

	TP#___					TP#___					TP#___					TP#___				
cmbs↓	L	B	S	R		L	B	S	R		L	B	S	R		L	B	S	R	
400-410																				
410-420																				
420-430																				
430-440																				
440-450																				
450-460																				
460-470																				
470-480																				
480-490																				
490-500																				
500-510																				
510-520																				
520-530																				
530-540																				
540-550																				
550-560																				
560-570																				
570-580																				
580-590																				
590-600																				

L = Lithic; B = Bone; S = Shell (bivalve); R = Rock (burned).

FORT HOOD ARCHAEOLOGICAL PROGRAM
1993-1994 NRHP Testing

List of Treatment Units

page ____ of ____

SITE NO.: ____________________
Testing dates: ____________________. Crew chief: ________________________

For each treatment unit, note its type (TP, BHT), number designation , general location, size, and maximum depth. Use the last column to note features and other summary comments. An example is shown at the bottom of this sheet. Precise distance and azimuth should be recorded separately by mapping instruments.

Unit type	Unit #	General location	Dimensions (L x W) (meters)	Ending depth (cmbs)	Comments
EXAMPLE: TP	17	10 m north of drainage cutbank; 5 m west of BRM feature 1; about 30 m northwest of TP5	1 x 1	140	slab hearth F6 at 70-90 cmbs; basal gravels at 140 cmbs

FORT HOOD ARCHAEOLOGICAL PROGRAM

1993-1994 NRHP TESTING

Excavated Feature Record

SITE NO.: ___________ Recorder: _____________ Date Begun: ___________

Feature No.: __________ Date Completed: __________

- Is the feature visible on the surface? yes no
  - If yes, give maximum length (m):__________, and width (m): _____________
  - If no, give *estimated* maximum length (m):_________, and width (m): _____________
- Was the feature 100% excavated? yes no
  - Give excavated length (m):__________, and width (m): _____________
  - The top of the feature is at ______ cm below surface / datum (circle one)
  - The bottom of the feature at ______ cm below surface / datum (circle one)
- List all excavation units (TPs & levels): _______________________________

- Location Within Site (*note* its relation to other features, associated occupation, slope, topography, etc.)

- Excavation Techniques (*describe* the methods used: shovel/trowel; natural/arbitrary; bisected & profiled; fine-screened, etc.)

- Function (*interpret* the feature's intennded use: hearth, roasting pit, post-hole, knapping station, etc.)

- General Observations (*describe* its shape, cross-section, coloration, context, etc.)

- Details of Construction (*describe* rock sizes, orientation, imbrication, matrix, etc.)

- Stratigraphic Position (*note* relation to surface, buried occupation, sediment zone, etc.)

- Evidence of Disturbance (*note* presence and degree of krotavina, erosion, potholes, etc.)

- Associated Artifacts (*note* type and number, *sketch* diagnostics, *note* if not collected?)

- Samples Collected (*note* type [pollen/float/charcoal/rock/etc.], context, possible problems)

- Photographs (*note* film type, roll #, frame #, orientation)

- Attachments ( ) plan sketch ( ) profile ( ) ___________

FORT HOOD SITE EVALUATIONS

Quality Control Program - Data Consistency Check

SITE ________ Checked By: __________________ Date: ___________

> > > Fill in all blanks and circle Yes or No; explain all "No" answers;

General

____ total TPs recommended; ____ total TPs dug.
____ total BHT recommended; ____ total BHT dug.
____ total features present;____ total features recorded.
explain and differences in above: ____

Y N Has all field work been completed as of above date?
excavation completed: __________ by ____________
Trenching/profiling completed: __________ by ____________
Instrument mapping completed: __________ by ____________
Y N Is the site number present on all sheets?

Site sketch map

Y N Is a sketch map included?
Y N Does the sketch map have a scale, north arrow, and site number?
Y N Are all TPs shown on the sketch map?
Y N Are all BHTs shown on the sketch map?
Y N Are all features shown on the sketch map?
Y N Is a photo base included?
Y N Does the photobase have a scale, north arrow, and site number?
Y N Are all TPs, BHTs, and features shown on the photobase?

Trench Records

Y N Is each trench profiled?
Y N Is each trench described?
Y N Are Munsells recorded?
Y N Are samples logged on Form 10?
Y N Are all BHTs and individually treated proveniences assigned PNUMs?

for any "N", explain (give BHT#):____

Test Pit Records (Form 8)

___ levels were excavated (Form 19); ___ level records are present.
Y N Are all level records present?

For EACH level record, inspect and verify the following:

Y N PNUM entered?	Y N recorder shown?	Y N date shown?
Y N top & bottom depths shown?	Y N datum circled?	Y N summarized?
Y N techniques circled?	Y N observations made?	Y N feature noted & numbered?
Y N rock weighed?	Y N rock counted?	Y N artifacts counted?
Y N samples noted	Y N photos noted?	Y N profile attached?

for any "N", explain (give TP# & level):____

Field Catalog (Form 10)

Y N Does the PNUM log assign/reserve numbers for previous treatment units?
Y N Are all new proveniences assigned PNUMs?
Y N Do PNUMs match Form 8 level records?
Y N Do artifact counts match Form 8 level records?

Feature Records (Form 9)

Y N Does each feature have a separate feature record?

For EACH feature, inspect and verify the following:

Y N site number shown?	Y N recorder shown?	Y N date shown?
Y N dimensions given?	Y N depths given?	Y N TPs indicated?
Y N samples collected?	Y N artifacts noted?	Y N photos noted?
Y N is the feature adequately described and interpreted with all prompts addressed?		
Y N profile attached? If Yes:	Y N profile scale shown?	Y N profile direction shown?
	Y N profile described?	Y N profile Munselled?
Y N plan attached? If Yes:	Y N plan scale shown?	Y N north arrow on plan?

for any "N", explain (specify feature):____

____

Photo Log

____ BW rolls with ____ still shots
____ color slide rolls with ____ still shots
____ videotapes

Y N Does each roll have a single site?
Y N Does each roll have a photo log?
Y N Are logged still shots listed on Form 8 level records?
Y N Are logged still shots listed on Form 9 feature records?
Y N Does each still shot have provenience indicated?
Y N Does each still shot have direction indicated?

Analysis (Form 18)

Y N Is every TP tabulated on Form 18?
Y N Does the number of levels for each TP on Form 18 match that on list of treatment units?
Y N Do the artifact frequencies on Form 18 match those on the level records?
Y N Are zeros used for negative levels?
Y N Are non-counted artifacts noted with an "*"?
Y N Are all levels with features circled?
Y N Is the bottom of each pit noted with a heavy line?

QC RECOMMENDATION

____ Site records are OK as recieved.

____ Site records had minor problems
 ___ have been corrected by QC officer.
 ___ have been returned to Crew Chief for correction.

____ Site records had major problems
 ___ have been returned to Crew Chief for correction.
 ___ PI notified for policy/procedure evaluation.

Field Exposure Description Form

Profile Designation ________ Date ________

Described by ________ Sampled By ________ Sample Types ________

Location ________ Quadrangle ________ Geologic Unit ________

Nature, texture of deposit ________ Geom. Surface ________

Remarks ________

Zone____ Depth________ Horiz ______
Texture: F/M/C Grvly/Sndy/Slty/Cly/Lmy Gravel/Sand/Silt/Clay/Loam
Struct:Mas/Blky/Plty/Colmn/Prism/Gran/Crum VF/F/M/C/VC Wk/Md/Str
Consist: VFr/Fr/Fm/VFm Ls/Sf/SHd/Hd/VHd NSt/SSt/St/VSt NP/SP/P/VP
Reaction N/W/M/S/V Mottles N/F/C/A F/M/C Faint/Dist/Prom
Bdry: Abr/Clr/Grad/Diff Smooth/Wavy/Irreg/Broken Color:______
CaCO3 Morph: F/C/A None/filam/film/rhiz/nod(f/m/c) Roots: N/F/C/A
Comment:________

Zone____ Depth________ Horiz ______
Texture: F/M/C Grvly/Sndy/Slty/Cly/Lmy Gravel/Sand/Silt/Clay/Loam
Struct:Mas/Blky/Plty/Colmn/Prism/Gran/Crum VF/F/M/C/VC Wk/Md/Str
Consist: VFr/Fr/Fm/VFm Ls/Sf/SHd/Hd/VHd NSt/SSt/St/VSt NP/SP/P/VP
Reaction N/W/M/S/V Mottles N/F/C/A F/M/C Faint/Dist/Prom
Bdry: Abr/Clr/Grad/Diff Smooth/Wavy/Irreg/Broken Color:______
CaCO3 Morph: F/C/A None/filam/film/rhiz/nod(f/m/c) Roots: N/F/C/A
Comment:________

Zone____ Depth________ Horiz ______
Texture: F/M/C Grvly/Sndy/Slty/Cly/Lmy Gravel/Sand/Silt/Clay/Loam
Struct:Mas/Blky/Plty/Colmn/Prism/Gran/Crum VF/F/M/C/VC Wk/Md/Str
Consist: VFr/Fr/Fm/VFm Ls/Sf/SHd/Hd/VHd NSt/SSt/St/VSt NP/SP/P/VP
Reaction N/W/M/S/V Mottles N/F/C/A F/M/C Faint/Dist/Prom
Bdry: Abr/Clr/Grad/Diff Smooth/Wavy/Irreg/Broken Color:______
CaCO3 Morph: F/C/A None/filam/film/rhiz/nod(f/m/c) Roots: N/F/C/A
Comment:________

Zone____ Depth________ Horiz ______
Texture: F/M/C Grvly/Sndy/Slty/Cly/Lmy Gravel/Sand/Silt/Clay/Loam
Struct:Mas/Blky/Plty/Colmn/Prism/Gran/Crum VF/F/M/C/VC Wk/Md/Str
Consist: VFr/Fr/Fm/VFm Ls/Sf/SHd/Hd/VHd NSt/SSt/St/VSt NP/SP/P/VP
Reaction N/W/M/S/V Mottles N/F/C/A F/M/C Faint/Dist/Prom
Bdry: Abr/Clr/Grad/Diff Smooth/Wavy/Irreg/Broken Color:______
CaCO3 Morph: F/C/A None/filam/film/rhiz/nod(f/m/c) Roots: N/F/C/A
Comment:________

Zone____ Depth________ Horiz ______
Texture: F/M/C Grvly/Sndy/Slty/Cly/Lmy Gravel/Sand/Silt/Clay/Loam
Struct:Mas/Blky/Plty/Colmn/Prism/Gran/Crum VF/F/M/C/VC Wk/Md/Str
Consist: VFr/Fr/Fm/VFm Ls/Sf/SHd/Hd/VHd NSt/SSt/St/VSt NP/SP/P/VP
Reaction N/W/M/S/V Mottles N/F/C/A F/M/C Faint/Dist/Prom
Bdry: Abr/Clr/Grad/Diff Smooth/Wavy/Irreg/Broken Color:______
CaCO3 Morph: F/C/A None/filam/film/rhiz/nod(f/m/c) Roots: N/F/C/A
Comment:________

Abbreviation Key *Texture*: Fine/Medium/Coarse; Gravelly/Sandy/Silty/Clayey/Loamy; *Structure*: Massive/Blocky/Platy/Columnar/Prismatic/Granular/Crumb; Very Fine/Fine/Medium/Coarse/Very Coarse; Weak/Moderate/Strong; *Consistence*: Very friable/friable/firm/very firm; Loose/soft/slightly hard/hard/very hard; Non-sticky—very sticky; nonplastic—very plastic; *Reaction (HCl)*: None/weak/moderate/strong/violent; *Mottles*: None/few/common/abundant; fine/medium/coarse; faint/distinct/prominent; *Boundary*: Abrupt/Clear/Gradual/Diffuse; *CaCO3 Morphology*: few/common/abundant None/filaments/films/rhizoliths/nodules (fine/medium/coarse)